Procurement

CONTRACTOR PERFORMANCE CERTIFICATION PROGRAM (CP) 2

15 AUGUST 1995

HEADQUARTERS, U.S. ARMY MATERIEL COMMAND

FOREWORD

This Pamphlet describes the Army Materiel Command (AMC) Contractor Performance Certification Program ((CP)2) and defines the methodology for assessment and certification of development, manufacturing and maintenance facilities. It provides a uniform set of assessment criteria and metrics for measuring contractor performance. Additionally, the pamphlet discusses incentives that may be used.

The pamphlet covers all the elements of the International Organization of Standardization Quality Standards (i.e., ISO 9000 series) to promote the use of commercial standards.

The title "Contractor Performance Certification Program ((CP)2)" has been maintained due to the extent of the program's use throughout the MSC's. This standardized program will strengthen the MSC's current programs and provide a common base for mutual recognition and providing future benefits.

Experience gained through use of this Pamphlet may result in future refinements to the (CP)2. Suggestions for refinement may be sent to Headquarters, Army Materiel Command, Attn: AMCRD, 5001 Eisenhower Avenue, Alexandria, Virginia, 22333-0001.

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CHAPTER 1

INTRODUCTION

1-1. PURPOSE

a. The purpose of this pamphlet is to provide a standard methodology to assess and measure the performance of development, production and maintenance facilities against uniform and definitive standards of excellence. Certification criteria are defined for both production and design/development together or separate. It provides a uniform, structured approach for contractor self-assessments and for Government assessment of contractor performance.

b. The pamphlet defines the methodology to be used in validating contractor performance. It is consistent with and complementary to other initiatives within the Department of Defense (DOD), such as DOD Manual on Transition From Development to Production (Critical Path Templates), DOD Instruction 5000, and Defense Logistic Agency's (DLA) Process Oriented Contract Administrative Services (PROCAS). All of these are aimed at increasing contractor performance while reducing overall contractor costs and Government administrative costs. It is compatible with Department of Army (DA) initiatives like acquisition streamlining, taking full advantage of a contractor's industrial practices and seeking to reduce unnecessary contractual requirements and Government oversight. In addition, this pamphlet is compatible with the international efforts to improve quality under ISO 9000 (ANSI/ASQC Q90). This pamphlet provides general guidance in the planning and performance of on-site assessments of a facility's development, production, and maintenance activities leading to facility certification.

c. The pamphlet discusses the benefits for both the Government and contractor and outlines some incentives of (CP)2 certification for certified contractors. Under Best Value principles, the Government should be able to reap significant savings by reducing oversight requirements on certified contractors without accepting undue risk.

1-2. SCOPE

a. The intent of this pamphlet is to provide guidelines which shall be used by AMC activities.

b. This pamphlet can be used by all contractors for their self-assessments.

c. This pamphlet contains all elements to be assessed with each contractor, however, the depth and breadth of assessment may vary from contractor to contractor. For this reason, skilled auditors with the appropriate background experience should be used to provide judgments as to the detail assessment elements.

1-3. CONCEPT

a. The recognition and ultimate certification of contractors under the (CP)2 as defined herein fosters excellence and continuous improvement and offers numerous advantages to both the Government and contractors. Properly planned, implemented and validated process improvements will improve quality, reduce costs, enhance productivity and materiel readiness, and assure user satisfaction.

b. The concept envisions the certification being based on identified contractor facilities, products, processes, and technologies ongoing at time of certification. Changes in ownership, or major changes in facilities, products or processes and technologies may require recertification of the facility.

c. The (CP)2 effort is a teaming approach of contractor and Government. In a nonadversarial environment, the two entities team to improve the contractor's processes until the Government gains confidence that the contractor meets certain criteria and is on a continuous improvement path. The (CP)2 is structured on the premise that contractors will conduct an objective self-assessment of their performance. This will then be followed by Government on-site assessments to verify the contractor's assessment and corrective action. Although this is the preferred method, the Government is willing to provide assistance at any time, including prior to on-site assessments, to help the contractor improve their processes.

d. Most on-site surveys or audits conducted by both Government and industry in the past have been directed toward the organizations responsible for the quality of the product or the product itself, rather than toward the processes that design and produce the product. A major factor contributing to this inefficient approach is failure to recognize that it is the processes that determine product quality and cost. The intent of this pamphlet is to describe an assessment methodology that is concerned with the total process, from design through acceptance of the manufactured product, rather than the more traditional, functional oriented review. Each of those functions is only important as it contributes to the processes that produce the products and to the acceptability of the product by the user.

e. The methodology described herein is appropriate for the review of private industrial, Government-owned/Contractor-operated (GOCO), and Government-owned/Government-operated (GOGO) facilities. It is applicable to facilities in the development, production, service and maintenance business and to those involved in only a portion of the four areas. Acceptance for entry into the (CP)2 and ultimate certification will be accomplished on a facility and technology or process basis, i.e., the certification will clearly define the facilities being certified and describe the technologies or processes provided by the facility. Certification will be granted based upon the processes in use at the facility during the time of the on-site assessments.

f. The thrust of this pamphlet is directed toward the development, production, service and maintenance processes and how well these are controlled. Since it is likely that contractors will only have a portion of these processes, the certification effort must be tailored to review only those portions that are appropriate. The overall scope of the certification and the facilities covered will be spelled out in the certifying Memorandum of Agreement (see paragraph 5-3f).

g. The success of both the self-assessment and the Government on-site assessments of the activity's ability to adequately control the processes is greatly dependent upon the skills and knowledge of the personnel conducting the assessment. The assessments, therefore, must be conducted by personnel knowledgeable in the various engineering, manufacturing, quality assurance, program management, safety and environmental disciplines and how these disciplines should be employed in integrated product and process development. These participants must be trained in assessment techniques. Training of Government auditors is discussed herein.

1-4. PROGRAM SUMMARY

a. Through (CP)2, contractors are formally recognized who have successfully completed a certification process which represents demonstrated high quality and commitment to continuous improvement in the design/development, production, and maintenance of material or services delivered to the Government. All contractors who have had or anticipate having Government contracts can volunteer to participate.

b. After receiving an informational briefing, the contractor can initiate the certification process by formally requesting entrance into the program. A self-assessment followed by Government/contractor validation are conducted per program criteria. Once acceptable performance against all criteria is validated, the contractor is certified.

c. Prerequisites for certification include a total commitment to producing quality designs and product, aggressive utilization of process controls, and preventative/proactive internal and external control of processes. Additionally, contractors should demonstrate continuous efforts to improve quality and productivity, stand behind their designs and/or products, and assure customer satisfaction.

d. Certification criteria are comprehensive. It can take in excess of 2 years to obtain certification.

e. The decision to certify a contractor must not be made lightly. The act of certification will provide the contractor with more capability in meeting Government contractual requirements. This may result in a competitive advantage, thus care must be taken to assure the contractor is worthy of certification. Certification is recognized by all the AMC major subordinate commands (MSC), therefore, it is incumbent on the certifier to assure all concerns of all customers, MSCs, project managers (PM), and Services are addressed.

f. After certification the contractor must maintain excellence and continuing process improvement in order to remain certified. Specifically, the contractor must maintain a high level of quality, continue corporate commitment to customer satisfaction and continuous improvement, preserve effective process controls system for procured and manufactured material, maintain an aggressive user feedback system and continually employ proactive internal controls. Certification is maintained based on periodic reassessments by the Government. Reassessments are performed on regularly scheduled timeframes, or whenever there is a question of a contractor's performance. The Contract Administration Office provides oversight, tracking continuous improvement trends and other indicators and may raise concerns at any time they feel there has been a significant degradation.

CHAPTER 2

DEFINITIONS

2-1 INTRODUCTION

This chapter presents definitions for the various terms and phrases used within this pamphlet.

2-2 DEFINITIONS

Significant definitions relating to the quality program criteria and methodology can be found in ISO 8402 and part two, paragraph 3 of ISO 9004.

Contractor Facility:

A specifically defined entity providing goods and/or services with which an AMC activity contracts. The contractor facility seeking certification need not be limited to a single building or site.

Contract Data Requirement List (CDRL):

The deliverable data items, usually noted on DD Form 1423, that are submitted to the Government during contract performance.

Critical Defect:

A defect that judgment and experience indicate is likely to result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the product; or a defect that judgment and experience indicates is likely to prevent performance of the tactical function of a major end item such as an aircraft, tank, land vehicle, missile, artillery, or other weapon system.

Special Acceptance Inspection Equipment (SAIE)/Special Inspection Equipment(SIE):

Equipment which is designated as a mandatory design and/or of a nonstandard configuration and is specifically design oriented, fabricated or purchased for requirements which a contractor cannot readily and/or adequately provide.

Special Defect: (Peculiar to Ammunition Only)

A defect, other than Critical, that judgment and experience indicate may, depending upon the degree of variance from the design requirement:

a. Result in hazardous or unsafe conditions for an individual using, maintaining, or depending upon the product, or

b. Prevent performance of the tactical function of the major end item.

Supplier/Vendor/Subcontractor: The use of the terms supplier, vendor or subcontractor in this pamphlet are considered as interchangeable.

CHAPTER 3

PROGRAM BENEFITS AND INCENTIVES

3-1. INTRODUCTION

This chapter discusses the benefits of the (CP)2 and the incentives planned to be used for certified contractors. Although there are inherent benefits gained by both the Government and contractor from improvements in the contractor's procedures and processes resulting in higher quality goods and services, the real benefits may come from the ability to establish long-term supplier relationships with certified contractors where oversight is reduced.

3-2. BENEFITS

a. The benefits of (CP)2 are numerous. The overall benefits of improving quality and management systems and defining and controlling processes are well documented in recent literature discussing the Quality Movement of the 1980s and '90s. Appendix A summarizes some of the more important of these as they relate to the Government and (CP)2. Appendix B summarizes the key benefits that the contractor gains from the (CP)2 program. These benefits vary from contractor to contractor with some gaining more than others. It may be argued that not all of these benefits apply or that others exist. As the program has evolved, so too have the benefits. As new initiatives are created, benefits may change according to industry response. Therefore, the benefits listed in the two appendixes should not be taken as all encompassing.

b. From the Government standpoint, (CP)2 helps assure meeting a primary objective of all acquisitions, i.e., a quality product that satisfies customer requirements. (CP)2 assures continued improvement in product quality while at the same time reducing unit costs as well as operation and support costs. These cost reductions are the result of the increased efficiency that result through process improvement.

c. The program will allow the Government to reduce oversight over certified facilities, thereby greatly reducing attendant administrative costs. Limited Government resources can be redirected toward contractors in greater need of assistance. As (CP)2 expands into other functional areas, further reductions in oversight of certified contractors will be achieved.

3-3. INCENTIVES

Although both Government and Contractor gain benefits as a result of improved processes from (CP)2, perhaps the greatest benefit may come from the Government being able to take advantage of certified contractors in the way we do business. Based on the knowledge that certified contractors have been assessed and found to have excellent control over processes, good past performance and a strong commitment to improve in the future, the Government can reduce oversight as much as possible. This has the potential to lead to great cost savings by both Government and contractors. Within this framework, appendix C contains several incentive techniques that may be used in contracting, with the appropriate necessary approvals. To obtain the widest benefits from these incentives, contractors must be given the opportunity to apply for (CP)2 and to become certified.

CHAPTER 4

ASSESSOR CRITERIA AND QUALIFICATIONS

4-1. GENERAL

a. The human element plays a critical role during the conduct of assessments. Although people conducting assessments cannot completely control the attitude and actions of personnel assigned to the facility being assessed, the assessors can greatly influence the relationship between the parties by acting in a professional manner throughout the assessment. The intent of this chapter is to address some of the important factors that influence the human element.

b. An important element of acting professionally at all times is the recognition that reasonable people can have different opinions about a particular issue that often results in heated discussions. The ability to participate in these discussions while maintaining a distinction between professional disagreement and personal animosity is the mark of a true professional. It is also essential that people conducting assessments continually exhibit that trait to prevent a counterproductive adversarial relationship from developing between the parties involved in the assessment.

4-2. BEHAVIOR

a. Assessment team members must adhere to rigid ethical standards to preclude any question of credibility or objectivity. Some of the more important ethical principles relative to assessments are addressed below.

b. Personnel conducting assessments must recognize that they are visitors, and should act as such with regard to abiding by the local rules and customary practices. This includes compliance with all safety regulations, working hours (to the extent possible), and lunch periods. Every effort should be made by the assessor to blend into the local environment. Any actions that tend to portray a superior attitude will reduce the auditors' effectiveness.

c. Personnel conducting assessments must be knowledgeable and have the appropriate skills required to properly evaluate the activity under review. Attempts to conduct the assessments without the necessary skills and knowledge will quickly become apparent to the people being assessed. At that point, the value and credibility of the assessor becomes questionable. Credibility suffers when it becomes obvious that the

skills and knowledge of the assessor relative to a particular subject (engineering, manufacturing, quality assurance, etc.) is considerably less than the skills and knowledge of the people being assessed.

d. The assessor must exhibit a great degree of tact and courtesy at all times during an assessment. Consideration must be made for the normal responsibilities and obligations of the personnel at the facility. The assessor must be flexible in their schedule and their demands for time from busy people. Above all, every effort must be made to avoid placing individuals in embarrassing positions.

4-3. TEAMWORK

a. The fact that this assessment methodology requires participation of personnel from the facility is a major factor in promoting a teamwork attitude on the part of both parties. Without a sense of teamwork, the chances that the assessment will be successful, including subsequent corrective action, are greatly diminished.

b. In addition to the amount of teamwork made possible by the methodology used, there is the significant degree that the human element contributes to that type of environment. The fact that both parties are striving for common goals and objectives must be stressed. Actions that promote an adversarial relationship cannot be tolerated at any time during the assessment. If this happens, the Government and Contractor Management must intervene. Remember, the purpose of the program is to help contractors improved so that they become certified.

4-4. COMMUNICATIONS

a. One of the most valuable tools of an assessor is effective communication in transmitting ideas and recommendations, and in receiving information from others. A few personal attributes that contribute to good communications are provided in the following paragraphs.

b. Avoid open disagreement. It is helpful to maintain an open mind, even though agreement with certain statements may not be possible at the time. Arguments lead to a contest of personal wills, and preclude further exchange of information that could possibly lead to mutual consensus and understanding. Maintain a positive attitude, and try to limit discussions to factual information rather than conjecture or personal opinions.

c. The assessor needs to be a good listener. Assessors must pay attention to conversations, minimize their own talking and avoid

dominating the discussion. All written or verbal information must be carefully studied for hidden messages or meaning. Avoid any distractions to the free flow of information.

d. Assessors must have a clear understanding of any situation prior to making judgments or evaluation. Avoid making value judgment comments.

4-5. PERSUASION

a. The final measure of success of any assessment is the manner in which necessary corrective actions are completed subsequent to the completion of the assessment. That, in turn, is dependent upon the degree that the facility is convinced that the actions are necessary. The assessors should play a major role in providing the persuasion required to convince all parties that any shortcomings noted during the assessment must be corrected, and to point out the benefits to be realized once the shortcomings are resolved.

b. Probably the poorest method to motivate a contractor to correct a shortcoming is to say: "It has to be done that way because ISO 9001 (or other Government standard) requires it to be done that way." While that may be true, it is not likely to be a strong motivator to the activity. It is far more effective to explain the benefit associated with the change.

c. The assessor should point out that most corrective actions necessary to resolve shortcomings noted during assessments will ultimately reduce costs, waste, and late deliveries and be a major factor in any particular contractor remaining competitive. That in turn offers increased job security to the employees of that facility. This line of discussion is a powerful appeal to the personal pride and prestige of the people who must receive the information pointing out the need for change.

4-6. QUALIFICATIONS

Assessors will have formal training in assessment techniques and quality standards such as ISO 9000 series or equivalent. Assessors are also encouraged to obtain professional certifications such as: American Society for Quality Control (ASQC) Certified Quality Assessor (CQA), Certified Quality Engineer (CQE), or Registration Accreditation Board (RAB) Quality Systems Assessor or Quality Systems Lead Auditor. Subject matter experts are encouraged to have formal assessment training, however, without formal assessment training may participate in an assessment when accompanied by a trained assessor.

CHAPTER 5

ASSESSMENT METHODOLOGY

5-1. INTRODUCTION

Once the contractor has learned of the (CP)2 program through any of the various mediums available, the following activities should occur:

a. An introductory briefing, at the request of the contractor, will be presented by the MSC contacted explaining the details of the (CP)2 program.

b. A letter will be forwarded to the contractor which briefly recaps the briefing and notifies the contractor that if they wish to enter the (CP)2 program a letter signed by the facilities most senior representative must be provided to the MSC.

c. Upon formal commitment by the contractor, the Government and contractor points of contact are established and the preassessment phase commences.

5-2. PREASSESSMENT

The preassessment phase of the (CP)2 program consists of the following general requirements:

a. The candidate contractor shall provide a listing of all Government contracts held (including Government point of contact), facilities and organizational charts prior to the initial assessment. The listing will be used to identify other MSCs or services with contracts with the candidate contractor. All MCSs will be invited to participate prior to initial assessment.

b. In the instance where more than one MSC has contracts with the candidate contractor a "lead" MSC for the certification effort will be identified by negotiation with all MSCs involved. The lead MSC will serve as the single point of contact with the contractor for the program.

c. The scope of the certification is determined by the contractor, in consultation with the Government, and can be; a joint Production and Design/Development certification, limited to Production Certification, or Design/Development Certification. For Joint Certifications, the entire

criteria section shall be used. For Production Certifications, paragraph 6-2.4 on Design Control shall be deleted. For Design/Development Certification, the entire criteria will be used but sections tailored only to review the Design portion of the facility.

d. All concerned MSCs will concur with the definition of the entities to be certified prior to the assessment phase.

e. The lead MSC will canvas the candidate contractor's customers for an assessment of the contractor's past performance.

f. A formal self-assessment evaluation to the assessment criteria is to be conducted by the candidate contractor prior to an initial on-site assessment. The self-assessment will be documented and a self-assessment summary, along with the documented quality system, will be provided to the lead MSC.

5-3. ASSESSMENT

The assessment phase commences with the completion of the contractor self-assessment and consists of the following:

a. The lead MSC will assemble a formal assessment team to perform an on-site baseline assessment of the contractor. The assessment will conform to ISO 10011-1, Guidelines For Auditing Quality Systems, or other currently acceptable professional quality auditing standards. Further requirements are as follows:

(1) DLA, other MSCs, other Services, and contractor personnel may serve on assessment teams.

(2) Assessors will have formal training in assessment techniques and quality standards such as the ISO 9000 series or equivalent. Assessors are encouraged to obtain professional certifications such as; American Society for Quality Control (ASQC) Certified Quality Assessor (CQA), Certified Quality Engineer (CQE), or Registration Accreditation Board (RAB) Quality Systems Assessor or Quality Systems Lead Auditor.

(3) The lead assessor for the lead MSC is responsible for compiling and providing the assessment checklists. The assessment checklist will be formulated using the assessment criteria in chapter 6. It may be supplemented based on the contractor's quality process and any additional information.

(4) Each of the 28 areas contained in the assessment criteria will be rated as explained in appendix D. The ratings are based on a 0-10 scale with a minimum rating of 8 in each area needed for certification.

(5) The assessment will be documented via a formal assessment report that is to be provided to all MSCs participating, the Defense Contract Management Command participants, and the contractor.

(6) The assessment team may perform product verification inspection on hardware.

b. The contractor may request additional reviews be performed as required to validate corrective actions on deficiencies noted by the Government assessment.

c. As a minimum, an on-site baseline and final assessment will be performed. Interim in-process reviews will be performed as required.

d. A contractor should remain active in the (CP)2 Program. An active contractor is one who demonstrates progress towards certification by implementing corrective actions and requesting periodic in-process assessments.

e. Concerns from all involved MSCs must be resolved prior to certification. This includes coordination with acquisition, legal and Project Management offices.

f. A certification Memorandum of Agreement will be developed that defines the responsibilities and commitments of the contractor and the Government. The agreement will identify the scope of the certification as to facilities, technologies, or processes and will be signed by senior management representatives of the contractor and all applicable government agencies. Also included will be a provision for the contractor to notify the lead MSC of significant management and administrative changes.

5-4. POSTCERTIFICATION

The postcertification phase will consist of the following:

a. Certification is awarded for a 3-year period at which time the lead MSC is responsible for evaluating whether a full or partial reassessment of the facility will be required for extension of the certification. Possible determining factors can include facility management changes, updates to the (CP)2 program and/or extension of the certification's scope. All MSCs will be repolled at this time.

b. The lead MSC should conduct management/program reviews with a certified contractor at least annually. The contractor should provide the lead MSC with continuous improvement program data at least semiannually (see paragraph 6-3.8).

c. The lead MSC will compile and investigate customer complaints against a certified contractor. The suspension/ decertification process, spelled out below, will be implemented as a response to a lack of effective corrective action to reported quality problems.

d. An MSC may send correspondence to a certified contractor concerning quality problems. The lead MSC will be copy furnished.

e. If a certified facility is acquired, the lead MSC has 90 days to determine the ramifications of possible management changes since notification. The certification continues in effect only for that portion of the new company which was certified.

f. MSCs can reserve the right to perform postcertification audits at the contractor after certification is awarded. Post- certification assessments should be considered for significant management or product line changes, if continuous improvement metrics show deterioration, loss of process control, major discrepancies noted during customer or company audits, excessive customer complaints, nonresponsiveness to customer complaints, product safety problems, delinquent deliveries, issuance of a method "C" corrective action request by the Administrative Contracting Officer (ACO), degradation of product quality, or declaration of bankruptcy.

g. The decertification process includes a suspension that may be followed by revocation if circumstances warrant. The contractor's certification will be suspended if the contractor is under indictment for fraudulent, unethical, or illegal activities. Suspension shall also occur if corrective actions required by postcertification assessment are not adequately addressed within 60 days. The lead MSC will issue a letter of suspension to the contractor which forbids further use of, or reference to, their certification, flag, plaque, advertising and rescinds all incentives and benefits. At this point the contractor may reinstate certification if they complete their approved corrective action and its implementation is verified. If corrective action is not implemented within a maximum of 120 days from suspension, the certification will then be revoked. Once revoked, the contractor can only regain certification by repeating the (CP)2 process. Revocation will also occur when the contractor has engaged in fraudulent, illegal, or unethical activity.

CHAPTER 6

ASSESSMENT CRITERIA

6-1. INTRODUCTION

a. This chapter is patterned after the criteria of ISO 9001, Quality Systems - Model For Quality Assurance in Design/Development, Production, Installation and Services (Second edition 1994). In addition to the criteria of ISO 9001, this chapter includes criteria for customer satisfaction, quality costs, warranty, ethics, business planning, environmental, safety, and a plan for continuous improvement.

b. This chapter is organized in such a manner that the ISO 9001 paragraph is referenced at the beginning of each assessment element. The applicable ISO paragraph contains all basic criteria that must be met. The ISO paragraph reference is followed by a discussion paragraph detailing additional criteria unique to (CP)2. Typical assessment criteria is provided for the auditor's general guidance. Detailed assessment criteria specific to a particular facility, process, or technology will be developed by the lead MSC. The final portion of each assessment element is devoted to metrics. Suggested metrics and typical performance levels are proposed throughout the Assessment Criteria Section. These performance indicators are used as a recommended baseline and are subject to negotiation between the applicable Government Agencies and the Contractor. Additional metrics may be utilized as desired. Further, it must be recognized that every metric may not apply at every facility. The assessment team will be responsible for determining applicability of all metrics.

c. Approaches used to ensure validity and consistency of data associated with metrics will be described by the contractor along with method of review, determination of problems and root causes, opportunity for improvement, follow up analysis, and use of data for Quality System Review. Trends may be indicated by the use of existing data from the previous 2 years and are to be monitored by the contractor. Where a meaningful metric cannot be established, some other means to assess progress should be described.

6-2. ASSESSMENT ELEMENTS

6-2.1 Management Responsibility. The minimum criteria for management responsibility are contained in ISO 9001 paragraph 4.1. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for management responsibility.

DISCUSSION/ADDITIONAL CRITERIA

A total quality management philosophy shall exist as evidenced by: Senior managers have visibly demonstrated commitment to continuous improvement. Resources are available for quality improvement activities. A formal quality improvement program exists and is publicized. Employees at any level can submit quality improvement ideas. Review, disposition, and implementation of employee suggestions is documented and maintained. Teaming of employees is utilized to solve problems and improve processes. Teams actively meet and record results. Teams include employees from all levels of the organization. Success stories and lessons learned are documented and shared.

ASSESSMENT CRITERIA

Has management communicated their quality policies and objectives to all levels of the company?

Does policy guidance and direction exist for all quality improvement efforts?

Have resources been used to support continuous improvement ideas?

Does executive management regularly review the status and effectiveness of the quality program and how is the review accomplished and documented?

Are teaming activities occurring and are the results reported to management?

Are continuous improvement activities publicized?

METRICS

Metrics at Contractors option.

6-2.2 Quality System. The minimum criteria for the quality processes are contained in ISO 9001 paragraph 4.2. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for the quality processes.

DISCUSSION/ADDITIONAL CRITERIA

Policies, responsibilities and functional interrelationships for the quality process must be defined. Specific functions, products, and processes must be evident.

ASSESSMENT CRITERIA

Are policies, responsibilities, and functional relationships defined?

Are specific quality functions, products, and processes evident?

Have specific functions such as configuration management and purchasing, adequately addressed quality?

METRICS

Metrics at contractor option.

6-2.3 Contract Review. The minimum criteria for contract review are contained in ISO 9001 paragraph 4.3. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for contract review.

DISCUSSION/ADDITIONAL CRITERIA

The contractor shall establish a process to assure that effective contract review/initial quality planning occurs. The process will ensure that the appropriate functions (engineering, quality assurance, program management, manufacturing, and procurement) have an opportunity to review the contract. Each functional element shall have reviewed the contract for capability to meet the contractual requirements. Upon completion of contract review, any areas requiring clarification shall be referred back to the customer. Records of all reviews and customer clarification shall be maintained. The contractor's system shall contain a provision for additional review if the contract is changed.

ASSESSMENT CRITERIA

Does the contractor have a contract review process?

Is the process producing the desired results?

Do all identified functional elements participate in the review?

Are records of all contract reviews maintained?

METRICS

Metrics at contractor option.

6-2.4 Design Control (design/development certification only). The minimum criteria for design control are contained in ISO 9001 paragraph 4.4. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for design control.

DISCUSSION/ADDITIONAL CRITERIA

Generally, military designs are technically complex projects requiring diverse assemblies such as mechanical, electronic, hydraulic, explosive, and analytical systems, to work together in the right place, at the right time for success. Even the simplest hardware is usually expected to perform in a wide variety of environments and to interface readily with other equipment.

The design process for such equipment demands a sound background of information, techniques, standards, procedures, and resources, in conjunction with a sound management organization to drive the program.

In order to investigate the existence of such a background, the way is open to measure and establish confidence in a contractor's technical and organizational abilities against some form of benchmark criteria. This section outlines, in narrative form, the minimum assessment criteria expected from a contractor who wishes to be certified in addition to the ISO 9001 model for Quality Assurance of Design through Production standard reprinted previously. The ISO 9001 standard is considered to be both comprehensive as well as flexible to all technologies. By using both sets of criteria and drawing upon the extensive experience of AMC and other Government Agencies to interpret them, an assessment can be made as to a contractor's design and development abilities.

Significant "up front" design tasks such as design reviews, engineering test, configuration control, policies and procedures, failure analysis and corrective action, design planning, producibility,

reliability, standardization and specification and their integration are considered to be essential areas for review. However, many other activities such as authorization, amendment, drawing numbering and recall, can also influence quality on the shop floor and subsequent design decisions - therefore criteria covering these tasks are applicable right across the design through production process and are included for use as appropriate.

Following the criteria narratives are a series of questions which have been developed to steer the assessor into appropriate areas and provoke meaningful and probing thought. The questions so derived are considered appropriate for the design and development of military hardware and software. Metrics that the contractor may use to measure their progress are also included. Where these metrics are not meaningful to the contractor, some other means to assess progress should be initiated.

All assessors involved in the (CP)2 effort are advised to read and understand, the model design assurance requirements of ISO 9001 and the guidelines of ISO 9004. It is important to realize that (CP)2 certification goes beyond the ISO's generically written requirements. Hence the need for more technology/technique specific criteria as described and interpreted here.

In the course of reviewing the contractor's measures to assure quality in design, the assessment team will be able to consider the appropriateness of techniques and methods used by the design organization. The Government does not seek to impose methods of working, but will need to be satisfied that the contractor's design organization is at least--

a. Strongly supported by management that understands and uses the collective strengths of staff.

b. Recruiting, training, and motivating the right type of people.

c. Providing up-to-date design aids, tools, test and evaluation support facilities.

d. Interfacing well with the customer and user.

e. Communicating well with other groups within the organization and removing barriers to the questioning of decisions.

f. Cultivating a team approach - "concurrent engineering," "life cycle" teaming, and integrated product and process development.

g. Maintaining close contact with manufacturing operations.

h. Planning for transition from development to production.

i. Operating a system to feedback information on past mistakes and successes.

j. Anticipating problems for which timely solutions must be found.

k. Individually developing and testing subassemblies/ subsystems of complex designs.

1. Extensively testing systems integration.

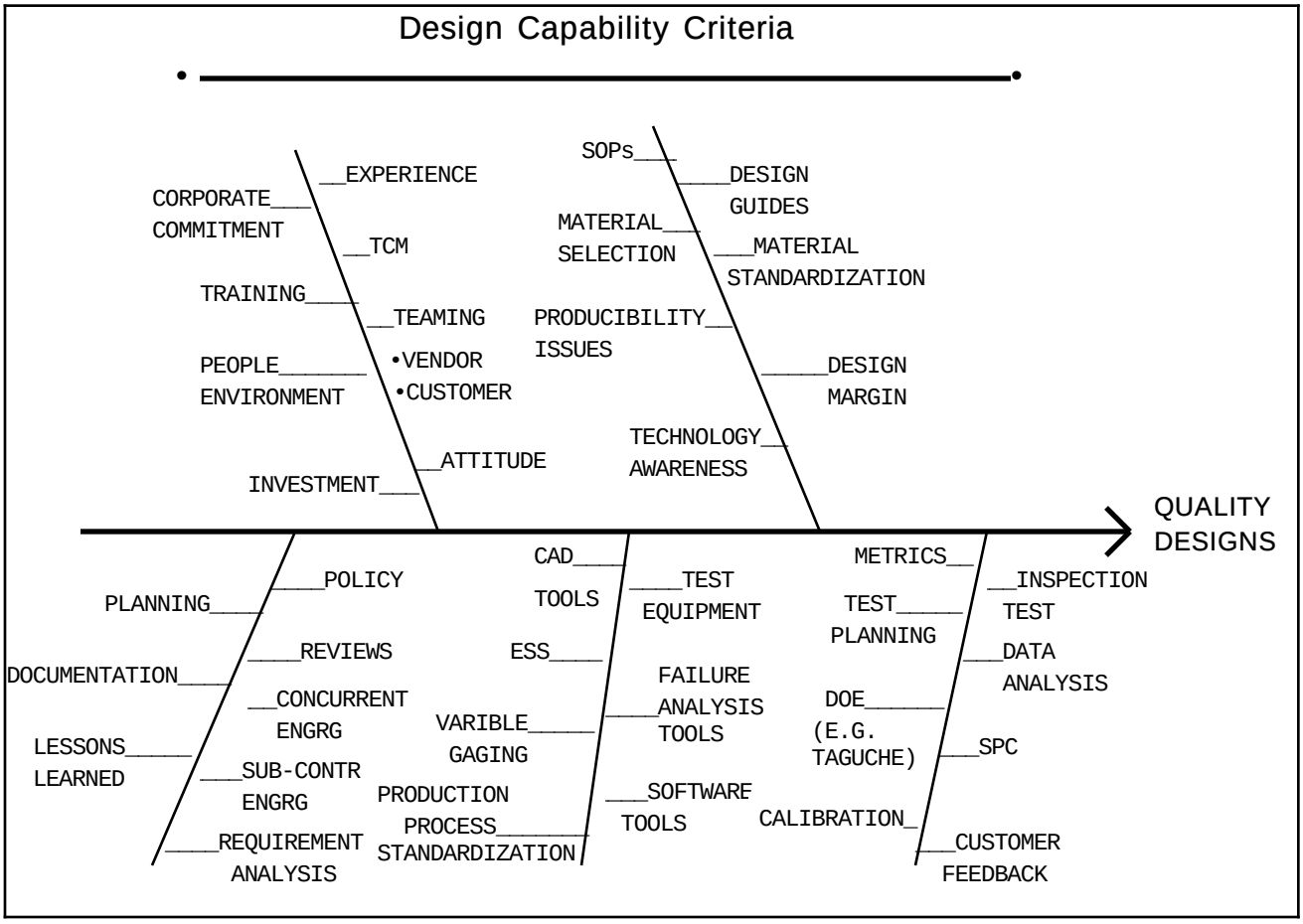
m. Establishing priority of customer requirements.

n. Allocating cost, reliability, and performance goals to subassemblies.

o. Employing a means of terminating nonproductive design approaches.

p. Carefully analyzing failures and feeding lessons learned back into the design process.

The assessment team will seek confidence that the contractor: 1) maintains adequate organizational structure, 2) has an able, suitably qualified, and experienced staff, 3) has or has access to the technical, test, and research facilities that are necessary to support the design effort in the field of military hardware/software, and 4) is managed efficiently and has effective policies and procedures to assure the achievement of quality in design. A synopsis of design capability is illustrated in the fishbone diagram shown below.



THE FOLLOWING SPECIFIC AREAS WILL BE ASSESSED

DESIGN PROCESS CONTROL

The contractor should have a definitive process for design and development. This process must be repeatable, controlled, and practiced throughout the organization. Engineering policies, procedures and practices shall provide guidelines and criteria to the design teams, and assure development of designs that optimize performance, producibility, and minimize cost. The policies, procedures, and practices need to address, as a minimum, the following:

a. The transition of customer requirements to design criteria and design planning.

b. Integrated Product and Process Development.

c. Producibility.

d. Configuration management and control, including software. (See assessment element 6-2.5)

e. An orderly phasing of the design process, and its inherent reviews, leading to system qualification and maturity.

f. Software development, if applicable.

g. Failure analysis and preventative/corrective action system.

h. Simulation, Test, and Analysis.

The contractor shall have a methodology for measuring how well he is accomplishing the above tasks. This methodology should include the appropriate metrics, analysis required and a mechanism for addressing any unfavorable trends.

ASSESSMENT CRITERIA

Does the contractor have a documented design control process?

Is the process producing the desired results?

Does the contractor's Design policy provide procedures for all appropriate technical disciplines?

METRIC

Content adequacy in relationship with actual activities. (Increasing Trend)

Applicability to current activity. (Increasing Trend)

Success rate in solving the overall concept. (Increasing Trend)

DESIGN PLANNING

The contractor should initiate planning for design and development activities at the earliest practical stage in the contract. Contracts shall be reviewed to assure a sound understanding of requirements and there shall be a clear process for assuring that the contractor and the customer are in agreement regarding the interpretation of requirements. The contractor will be proactive in seeking clarification of unclear requirements and will strive to understand all design aspects which might adversely affect system performance. The contract will also be reviewed to identify and plan for any special or unusual requirements.

Planning shall be coordinated and integrated throughout all design activities. Planning shall include a review of skills required for the effort to assure that the contractor has adequate skills and experience, or identifies training required. Planning schedules should be frequently reviewed for updating based on current status, problems, corrective action report, and lessons learned. The contractor should conduct long range planning, identifying critical paths, establishing specific goals and objectives, and investigate new methods or other opportunities for process and system improvement. (See Technical Risk Management)

ASSESSMENT CRITERIA

Are contracts reviewed to assure adequate planning for special or unusual needs?

Are contracts reviewed to assure a sound understanding of requirements (contract specified or contractor generated)? Is there a clear process for assuring that the contractor and customer are in agreement regarding interpretation of requirements?

Are planned activities and critical paths identified? Are all areas of design, test, and manufacturing activities coordinated?

Are planning schedules frequently reviewed for updating based on current status, problems, corrective action reports, and lessons learned?

METRICS

Success rate in meeting requirements. (Increasing Trend)

Requirements reviewed and agreed against requirements specified. (Increasing Trend)

Design review actions closed on time or prior to next review. (Increasing Trend)

TECHNICAL RISK MANAGEMENT EFFORT

Risk Management is a systematic approach to a structured decision making process and provides analytical techniques for evaluating these decisions. A Company that truly supports a risk management philosophy has clearly established processes for implementation of these analytical management techniques. In today's environment of continuous process improvement, strategies for evaluating and measuring the impacts of these evolutionary changes must be managed and evaluated to determine the impacts, not only on the time it will take to accomplish any change (i.e., schedule impacts), but also on cost and performance.

The contractor should have a risk management process to identify, track, evaluate, and manage the contractor's risk. This process should be an integrated approach, using various strategies to improve performance, reduce cost and decrease schedule. Technical risk reduction tools may include tolerance analyses, stress analysis, finite-element analyses, derating, and sneak circuit analyses. The contractor should support risk management by fully understanding the risk process, implementing the principles, and reporting the results.

A risk management process can be used to identify the critical path for program completion, to perform sensitivity analysis and must be capable of being audited. The process should contain the activities that are necessary to manage risk and the relationships using the logical interdependencies between these activities. The contractor should have a process and assign the resources to: (1) identify areas or items of risk, (2) determine the probability of each risk item, (3) determine the impact to the program should the risk become reality, (4) develop a risk mitigation strategy for each item indicated as necessary by its probability and impact, and (5) continuously monitor the program to drop or add items for tracking as the program progresses or changes occur.

In addition, a mechanism should exist which ensures that key management officials are provided the risk information on a timely basis so that risk mitigation strategies may be implemented and program impacts eliminated or minimized. A formal methodology for estimating the risk associated with each activity must be defined with a documented assessment trail, in order to achieve the program goals. Risk Management is a continual process that should be quantified in the terms of cost, time, and quality of work or performance. A world class contractor should have a history of the application of risk management techniques that are integrated into the company philosophy.

ASSESSMENT CRITERIA

Does the contractor have a Risk Management process?

Is the process producing the desired results?

METRICS

Accomplishment of predicted schedule/costs/operations and support costs. (Increasing Trend)

Success rate in solving the problems with vital parts/sub-systems. (Increasing Trend)

CONCURRENT ENGINEERING/INTEGRATED PRODUCT AND PROCESS DEVELOPMENT (CE/IPPD)

The contractor shall use a CE/IPPD approach throughout the design process. This approach should integrate all technical disciplines into a coordinated effort to meet performance, cost, schedule, and supportability requirements. The approach should also assure compatibility of all functional and physical interfaces. Design teams must address the total system life cycle, from design inception through production and disposal. All engineering disciplines should be integrated into the design team. Disciplines include design, configuration management, producibility, test and verification, deployment and installation, operability, reliability, maintainability, survivability, quality, software engineering, support, training, human factors engineering, system safety, system security, and manpower and personnel integration (MANPRINT). The contractor design teams should include customer and subcontractor personnel and/or input as necessary. Teams must have adequate resources and authority to perform the total system design effort.

ASSESSMENT CRITERIA

Is the CE/IPPD approach implemented throughout the design process?

Are all necessary functions represented on design teams?

Are customers and suppliers integrated onto design teams when appropriate?

METRICS

Actual staffing against planned. (Increasing Trend)

Success rate in solving major technical difficulties in compatibility. (Increasing Trend)

SUPPLIER RELATIONSHIPS

Supplier empowerment is critical to the success of a program during the development phase. Key suppliers should be incorporated into the overall program planning and development as early as possible so they can participate in design trade-off studies as well as the detailed design activities. The key
suppliers should be integrated into the proposal preparation activities and contribute to the Concurrent Engineering or Integrated Product Development (CE/IPPD) process early so that the full advantage of their product, system and/or process knowledge can be derived. They should participate in the establishment of design parameters, risk management requirements, key characteristic and process identification requirements, and be given the responsibility to assure their performance requirements are met.

Suppliers used during the design/development phase should be subjected to the supplier selection and rating system for performance, history and quality outlined in assessment element 6-2.6 under discussion/additional criteria.

ASSESSMENT CRITERIA

Are subcontractors active participants in design teams, reviews, trade-off studies, proposals, etc.?

METRICS

Percent of design suppliers certified under Vendor Certification Program per assessment element 6-2.6. (Increasing Trend)

Reduction in audit noncompliances at subcontractors. (Decreasing Trend)

PRODUCIBILITY

A producible design includes complete engineering and manufacturing

coordination in the selection of materials, processes, facilities, and personnel. Design engineers need to be kept abreast of developments in manufacturing technology, and manufacturing personnel need to be given an early opportunity to identify "requirements" that will be difficult or expensive in production. Producibility includes Design Trade Off Studies, Critical Characteristics Process Identification and Control, Variability Reduction and Program Manufacture.

DESIGN TRADE-OFF STUDIES

Design trade studies should be used by the contractor to direct the effort that provides for balanced product design, considering cost, schedule and performance. The trade studies should include consideration for the product, production processes, special tooling, special inspection equipment (ST/SIE), performance and cost. The absolute requirements stated in the system specification form the baseline effort. However, design margins are needed for every requirement, and it is intended that the contractor have the flexibility to address how much margin is applied within the program constraints (cost and schedule). The bottom line is that the absolute requirements must define a system that meets the customer's needs, but every effort should be made to improve performance/cost/schedule within program constraints and/or identify elements which require additional resources.

Consideration of producibility and supportability during design trade studies is a key element of the concurrent engineering/integrated product and process development (CE/IPPD) concept. To be truly effective, these trade studies should identify alternative production processes and consider the economic loss functions (reference Taguchi methods) for each potential alternative. The design trades should consider robust product designs which are tolerant to the intended manufacturing, assembly, test, and usage environments. The studies should assist in selecting the overall design which represents minimum life cycle cost within the program constraints.

The trade study process may include the following elements:

1) Flow down the design trade study task requirements to the suppliers, and integrate key suppliers into the CE/IPPD process.

2) Integrate the trade study effort into the CE/IPPD master plan (or equivalent detailed plan used) identifying the contractor's key events which support the milestone requirements.

3) Conduct, document, and validate the trade studies which result in the product or ST/SIE designs.

4) Provide the status of the trade studies and rationale for the trade study results at key events and milestones.

5) Identify opportunities for additional product/process improvement which exceed existing program constraints of cost and/or schedule, but which could provide significant investment potential for system improvement (cost, schedule and/or performance).

ASSESSMENT CRITERIA

Does the contractor have a Trade-off study procedure?

Is the procedure producing the desired results?

METRICS

Number of Standard Parts vs. Total Number of Parts per program. (Increasing Trend)

Performance Margin.

Producibility Margin.

CRITICAL CHARACTERISTICS

PROCESS IDENTIFICATION AND CONTROL

The contractor shall implement a process for identification of critical product characteristics and their design limits, and the identification of critical production processes and determination of their capabilities. The intent is to: a) identify those characteristics of the design which most influence performance, supportability, and cost; b) determine the production process(es) which best match the product requirements; c) verify the capability of the process; and d) develop the required process control for production. The effort to fulfill many of these requirements will be accomplished by the design teams through design trade-off studies and other tools.

To minimize the risk associated with the transition from design to production and to control product cost and quality, it is essential to identify, and control critical production processes at the earliest possible point in the design effort. The identification of critical processes will start with the identification of critical product characteristics. Critical characteristics may include, weight, reliability, accuracy, transportability, cost, availability, etc.

Therefore, critical processes are those having the greatest impact on the components and subsystems that control the critical characteristics. Once critical component and subsystem requirements have been established, the contractor must determine the capability of the processes controlling those characteristics. Control of the critical processes must be the focus of the contractor's Statistical Process Control (SPC) Program. Process capability should be authorized through the use of Variability Reduction, Design of Experiments and other methods.

It is essential that these requirements flow down to key suppliers whose products will have an effect on the contractor's attainment of critical characteristics requirements. Development and production specifications and drawings should reference critical product characteristics and their associated process specifications when available.

ASSESSMENT CRITERIA

How does identification of critical characteristics flow down to identify the critical processes controlling them?

Are suppliers given responsibility for controlling the processes that effect the critical characteristics identified by the contractor?

METRICS

Number of Critical Processes vs. Total Number of Processes per program. (Decreasing Trend)

Success rate in solving major technical difficulties in weight. (Increasing Trend)

VARIABILITY REDUCTION (VR)

The contractor shall have a procedure for Variability Reduction. Variability Reduction efforts during development are intended to establish a process which improves product quality and manufacturing processes. During the production phase, VR should continue to be used to improve process capability and product quality even after the baseline program requirements have been achieved. The primary purpose of the VR effort is to reduce production variability in order to provide a higher quality of delivered product and to enhance long term supportability. The VR effort should start early in the design effort with identified critical processes, but not be confined to them. Initially in a VR effort the design team would identify candidate processes. These

processes would then be evaluated for stability and capability followed by an assessment of potential improvements. The team should be empowered to assess and implement the potential improvements and be responsible for monitoring their effectiveness. Variability reduction efforts should be encouraged and/or required for suppliers/subcontractors whose processes have a significant impact on end item quality.

ASSESSMENT CRITERIA

Is a VR process present in early process development functions?

METRICS

Number of processes (including critical) incorporated in the VR system. (Increasing Trend)

Design Margin/Process Variability.

PROTOTYPE MANUFACTURE

When the contractor fabricates for information or is contracted to build design prototypes for testing against design requirements, the manufacturing and assembly processes should be as similar to the expected actual production processes as is possible.

ASSESSMENT CRITERIA

When development hardware is built in a production environment the following questions apply:

What procedures assure that fabrication and production processes are accomplished under controlled conditions to include special emphasis on work and inspection instructions, adequate production equipment, special working environments and compliance with reference standards, codes and quality process?

When physical inspection of processed material is impossible, disadvantageous or inadequate to ensure control, what procedures ensure that indirect control by monitoring equipment and personnel is provided?

What procedures ensure that methods of inspection and monitoring are corrected when they are found to be unsuitable?

What procedures require that approval and rejection criteria will be established for the auditing of methods, equipment, and personnel?

What procedures for final inspection and testing require that all specified inspections and tests be performed and confirm that the data/product meets specified requirements?

What procedure assures reinspection/testing of all characteristics affected when modifications, repairs or replacements are required after final inspection and testing?

Where hardware is built in a lab environment, the following questions shall be reviewed:

Are there adequate procedures defining and controlling non-production manufacture of developmental hardware?

Are there sufficient work instructions to assure acceptable manufacture of product?

Is there adequate record keeping to identify the configuration of development hardware as well as to validate its acceptability?

Are manufacturing and test problems or deficiencies recorded and reported for failure analysis and corrective action?

Is there a policy to determine when development hardware should be built in a production environment?

METRICS

Equality of design to prototype/model tested. (Increasing Trend)

Closing of actions resulting from test failure. (Increasing Trend)

Adequacy of test facilities, instrumentation vs. program. (Increasing Trend)

DESIGN REVIEWS

The contractor shall have a process for design reviews. Formal design reviews shall be performed at defined intervals to assess areas such as--

a. Mechanical and electrical design status.

b. Performance.

c. Physical and functional interchangeability.

d. Use of standard component/processes.

e. Configuration control.

f. Reliability and maintainability.

g. Testing.

h. Software.

i. Producibility including inspectability.

j. Safety - security, etc.

k. Design Robustness.

The review team/panel should be headed by an independent chairperson who has a high level of technical competence and expertise, but who has no direct responsibility for the work under review. Design review teams should be multidiscipline and will typically consist of--

a. Engineering.

b. Project management.

c. Production.

d. Quality Assurance.

e. Material control/purchasing.

f. Safety.

g. The customer.

Even when reviews are internal and not driven by formal customer design reviews, the customer should be invited to participate. All design reviews shall be documented and any action items that are assigned shall be followed up on.

ASSESSMENT CRITERIA

Do procedures for how and when to hold design reviews exist and are they followed?

Are internal reviews conducted that are based on design maturity and not driven by formal customer reviews?

METRICS

Scope of Design review in relation to Requirements/ Objectives. (Increasing Trend)

Currency of plans to maturity of design/development. (Increasing Trend)

Customer review actions closed (Design, Hardware, Software, Documentation). (Increasing Trend)

FAILURE ANALYSIS AND PREVENTIVE/CORRECTIVE ACTION SYSTEM (FAPCAS)

A failure analysis and preventive/corrective action system, which identifies and prevents defects, is critical to support the design and engineering process. Key elements of the program are, as a minimum--

a) A process for reporting all defects and test failures.

b) Failure analysis to determine causal factors and process solutions.

c) Implementation of corrective/preventive action.

d) Documentation of findings for future design activities.

e) Modifications as necessary of design process handbooks and support activities to eliminate use of processes which allow these defects to occur.

The process should be well established. It should provide for tracking and trending failure data and nonconformance data and should assure that corrective action is taken when appropriate analysis indicates it is warranted. The need for root cause corrective action is especially critical during the development phase, when changes to the product design can be most readily effected. The data relating to nonconformances and failures must be analyzed to determine root causes and assure there is no overall degradation in the contractor's control over quality.

All hardware procured or built during design/development that have nonconformances or have experienced test failures should be controlled per the procedures outlined in ISO 9001, paragraph 4.13, Control of

Nonconforming Material. The root cause corrective actions should be tracked per the procedures in ISO 9001, paragraph 4.14, Corrective and Preventative Action.

The primary purposes of the FAPCAS system is to affect necessary design changes early in the development process in order to avoid more costly nonconformances, design changes and test failures during production and fielding. This can only be accomplished using thorough root cause analysis and verification of the effectiveness of prescribed corrective and preventative action.

ASSESSMENT CRITERIA

Are there procedures for conducting FAPCAS?

Who performs failure analysis, and who collects and studies reliability data?

How is FAPCAS performance communicated to design engineers and to senior management?

Does the contractor maintain a data base of all failures and corrective actions?

METRICS

Tests accomplished against those planned. (Increasing Trend)

Critical failure modes against total failure modes. (Decreasing Trend)

Design errors revealed against all reasons for failure. (Decreasing Trend)

SIMULATION, TEST AND ANALYSIS

A comprehensive simulation, test and analysis effort is essential to assure that the end item meets all performance and supportability requirements with minimum technical and program risks. The contractor should develop a master test plan that evaluates satisfaction of user/contractual requirements. Testing may include: proof of concept/exploratory testing, design support testing, qualification testing, acceptance testing, etc. Analytical support may include: design of experiments (e.g., Taguchi), system simulation, virtual prototypes, etc. The test plan should define the required test methods and test objectives, identify the field support requirements, determine the

necessary facilities/services and equipment, establish data reduction and analysis requirements, and develop the overall schedule.

The test results and analyses should support the design approaches taken and conclusions reached. The results should also be available in advance of each major decision point in the program. Schedules should allow sufficient time for redesign/ test when necessary, based on simulations and/or predictive analysis performed prior to test. Accomplishment of the above requires the contractor to work closely with the customer. Open access to all test plans, data, analysis and results by customer personnel is essential.

ASSESSMENT CRITERIA

Does the contractor have a process for simulation, test, and analysis?

Is the process producing the desired results?

METRICS

Success rate of design fixes. (Increasing Trend)

Tests accomplished against those planned. (Increasing Trend)

Recurring failures (for the same reasons). (Decreasing Trend)

SOFTWARE DEVELOPMENT

The software development capabilities will be assessed against the enclosed criteria. This criteria was derived from the Software Engineering Institute's (SEI) capability maturity model for software, but is only a subset of all SEI questions. The level numbers correspond to the SEI certification levels for ease of cross-referencing, however, for (CP)2 certification all the enclosed criteria must be satisfied. The criteria only contains that portion of the SEI criteria which must be met for (CP)2 certification.

If the contractor has been certified to a particular SEI level, the contractor may use his SEI assessment in lieu of the equivalent criteria herein when performing his self-assessment for (CP)2. The SEI assessment and the (CP)2 self-assessment covering the remaining levels not certified to, shall be submitted to the Government prior to the Government baseline assessment. The Government will use both the SEI and the contractors self-assessment in its (CP)2 assessment and will not automatically assume the contractor meets the level certified to.

LEVEL II SOFTWARE PROCESS CRITERIA

a. Does the system requirements allocated to software provide a clearly stated, verifiable, and testable foundation for software engineering and software management?

b. Do the allocated requirements define the scope of the software effort?

c. Are the allocated requirements and changes to the allocated requirements incorporated into the software plans, products, and activities in an orderly manner?

d. Does the organization follow a process for managing the project requirements that determine and bound the software activities?

e. Is there a procedure developed that appropriately and realistically covers the software activities and commitments?

f. Do all affected groups and individuals understand the software estimates and commit to support them?

g. Are the software estimates used in tracking the software activities and commitments?

h. Is a project software manager designated to be responsible for negotiating commitments and developing the project's software development plan?

i. Does the organization have a process for planning a software project?

j. Are actual results and performance of the software project tracked against approved baselines?

k. Are corrective actions taken when the actual results and performance of the software project deviate significantly from the plans?

l. Are changes to software commitments understood and agreed to by all affected groups and individuals?

m. Is a project software manager designated to be responsible for the project's software activities and results?

n. Does the organization have a process for managing a software project?

o. How do you select qualified subcontractors?

p. Do software standards, procedures, and product requirements for the subcontract comply with your commitments?

q. Are commitments between you and subcontractor understood and agreed to by both parties?

r. Do you track the subcontractor's actual results and performance against the commitments?

s. Does the organization have a process which requires projects to use standards, procedures, and processes in selecting software subcontractors and managing the software subcontract?

t. Is a manager designated to be responsible for establishing and managing the software subcontract?

u. Is compliance of the software product and software process with applicable standards, procedures, and product requirements independently confirmed?

v. When there are compliance problems, is management aware of them?

w. How does senior management address noncompliance issues?

x. Does the organization have a process for implementing software quality assurance (SQA)?

y. Are controlled and stable baselines established for planning, managing, and building the system?

z. How is the integrity of the system's configuration controlled over time?

aa. Are the status and content of the software baselines known?

ab. Does the organization have a process for implementing software configuration management (SCM)?

LEVEL III SOFTWARE PROCESS CRITERIA

a. Are current strengths and weaknesses of the organization's software process understood and procedures established to systematically address the weaknesses?

b. Is a group established with appropriate knowledge, skills, and resources to define a standard software process for the organization?

c. Does the organization provide the resources and support needed to record and analyze the use of the organization's standard software process in order to maintain and improve it?

d. Does senior management sponsor the organization's activities for software process assessment, definition, and improvement?

e. How does senior management oversee the organization's activities for software process definition and improvement?

f. Is a standard software process for the organization defined and maintained as a basis for stabilizing, analyzing, and improving the performance of the software projects?

g. Are specifications of common software processes and process experiences from past and current projects collected and available?

h. Does the organization have a process governing the definition of the organization's and projects' software processes?

i. Do the staff and managers have the skills and knowledge to perform their jobs?

j. Do the staff and managers effectively use, or are prepared to use, the capabilities and features of the existing and planned work environment?

k. Are staff and managers provided with opportunities to improve their professional skills?

l. Does the organization have a process for meeting its training needs?

m. Is planning and managing of each software project based on the organization's standard software process?

n. Are technical and management data from past and current projects available and used to effectively and efficiently estimate, plan, track, and replan the software projects?

o. Does the organization have a process to manage the software projects using the organization's standard software process?

p. Are software engineering issues for the product and the process properly addressed in the system requirements and system design.

q. Are software engineering activities well-defined, integrated, and used consistently to produce a software system?

r. Are state-of-the-practice software engineering tools and methods used, as appropriate, to build and maintain the software system?

s. Does the organization have a process for guiding the software engineering activities?

t. Are software engineering products that are consistent with each other and appropriate for building and maintaining the software system systematically developed?

u. Are the project's technical goals and objectives understood and agreed to by its staff and managers?

v. Are the responsibilities assigned to each of the project groups and the working interfaces between these groups known to all groups?

w. Are the project groups appropriately involved in intergroup activities and in identifying, tracking, and addressing intergroup issues?

x. Do project groups work as a team?

y. Does the organization have an environment which enables people from different disciplines to work together?

z. Are product defects identified and fixed early in the life cycle?

aa. Are appropriate product improvements identified and implemented early in the life cycle?

ab. Do staff members become more effective through a better understanding of their work products and knowledge of errors that can be prevented?

ac. Is a rigorous group process for reviewing and evaluating product quality established and used?

ad. Does the organization have peer reviews?

LEVEL IV SOFTWARE PROCESS CRITERIA

a. Is the organization's standard software process stable and under control?

b. Is the relationship between product quality, productivity, and product development cycle time understood in quantitative terms?

c. Are special causes of process variation (i.e., variations attributable to specific applications of the process and not inherent in the process) identified and controlled?

d. Does the organization have a process to measure and stabilize its standard software process?

e. Are measurable goals and priorities for product quality established and maintained for each software project through interaction with the customer, end users, and project groups?

f. Are measurable goals for process quality established for all groups involved in the software process?

g. Are the software plans, design, and process adjusted to bring forecasted process and product quality in line with the goals?

h. Are process measurements used to manage the software project quantitatively?

i. Does the organization have a process for managing quality on software projects?

LEVEL V SOFTWARE PROCESS CRITERIA

a. Are sources of product defects that are inherent or repeatedly occur in the software process activities identified and eliminated?

b. Does the organization have a process governing defect prevention activities?

c. Does management support and participate in defect prevention activities?

d. Does the organization have software process and technology capability to allow it to develop or capitalize on the best available technologies in the industry?

e. Is selection and transfer of new technology into the organization orderly and thorough?

f. Are technology innovations tied to quality and productivity improvements of the organization's standard software process?

g. Does the organization have a process for improving its technology capability?

h. Does senior management sponsor the organization's technology innovation activities?

i. Does senior management oversee the organization's technology innovation activities?

j. Are the organization's staff and managers actively involved in setting quantitative, measurable improvement goals and in improving the software process?

k. Does the organization's standard software process and the projects' defined software processes continually improve?

l. Are the organization's staff and managers able to use the evolving software processes and their supporting tools and methods properly and effectively?

m. Does the organization implement software process improvements?

n. Does senior management oversee the organization's activities for software process improvement?

METRICS

Software errors per line of code. (Decreasing Trend)

Software documentation errors per page. (Decreasing Trend)

Predicted results vs. Actual results. (Increasing Trend)

ADDITIONAL EXAMPLES OF METRICS FOR DESIGN/DEVELOPMENT

The following sample metrics may be used to measure various processes during design/development. Instead of the metrics that are called out, the contractor may choose an appropriate metric from this list or create a useful metric for their own facility.

Efforts should concentrate on selecting the best metrics and aiming these to demonstrate comprehensive management and review of data, such that the results may be used convincingly to indicate trends and progress in quality design improvement.

Approaches used to ensure validity and consistency of data will be described by the contractor along with method of review, determination of problems and root causes, opportunity for improvement, follow up analysis, use of data for Quality System Review, etc.

Trends may be indicated by the use of existing data from the previous 2 years and are to be monitored by the contractor.

Where a meaningful metric cannot be established some other means to assess progress should be described.

Percent of CDRLs approved on first submission. (Increasing Trend)

Number of test failures vs. total number of items tested. (Decreasing Trend)

Number of Material Review Board (MRB) actions per month (engineering change proposals (ECP)/request for waivers (RFW)/request for deviations (RFD)). (Decreasing Trend)

Percent of Product submitted on time. (Increasing Trend)

Scrap Rate Percentage. (Decreasing Trend)

First Pass Yield Percentage. (Increasing Trend)

Success rate in solving major technical difficulties in space. (Increasing Trend)

Success rate in solving major technical difficulties in weight. (Increasing Trend)

Design complexity of Software/Hardware. (Decreasing Trend)

Trend of unknowns to knows through maturity. (Decreasing Trend)

Currency of design documentation, Calculations, tests, etc. vs. maturity of design. (Increasing Trend)

Error free drawings/documents at each checking stage. (Increasing Trend)

Design changes documented vs. changes incorporated. (Increasing Trend)

Trend of predicted data/document deliveries vs. delivered. (Increasing Trend)

Achievements vs. Predictions vs. Requirements.

Short term tests at extreme conditions vs. Long term test at typical conditions.

Currency of plans, prediction, tests to maturity of design. (Increasing Trend)

Maintainability objectives met per design stage. (Increasing Trend)

Proportion of tests producing useful data. (Increasing Trend)

Adequacy of test records (completeness of information). (Increasing Trend)

Test equipment functional failures vs. total activity or time. (Decreasing Trend)

Trend of component interface problems. (Decreasing Trend)

Availability of current applicable standards. (Increasing Trend)

Calibration delinquencies vs. calibrated units. (Decreasing Trend)

Purchase order error rate. (Decreasing Trend)

Contractors own system review findings - actions closed. (Increasing Trend)

Unit production costs. (Decreasing Trend)

Productivity/cycle time.

Use of "in the field" defect information. (Increasing Trend)

6-2.5 Document and Data Control. The minimum criteria for document and data review are contained in ISO 9001 paragraph 4.5. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria in document and data control.

DISCUSSION/ADDITIONAL CRITERIA

The contractor shall establish and maintain a document control process. Document control should include those documents pertinent to design, purchasing, work execution, quality standards, inspection of materials and the contractor's internal written procedures, at a minimum. Documents shall be available at the location where adherence is essential to quality performance. All changes to documents should be reviewed and approved by the organization that conducted the initial review. Controls should exist for the preparation, handling, issue, and recording of changes to documentation. The contractor shall maintain an update of a master control list or equivalent reflecting the latest revision and distribution. The process will require timely disposal of obsolete documents.

ASSESSMENT CRITERIA

Does the contractor have a document control process?

Is the process producing the desired results?

Are all outdated documents removed from circulation?

Are documents reissued after a practical number of changes have been made?

Does a master list exist to identify current revision and location to ensure obsolete documents are not utilized?

METRICS

Percentage of ECPs approved by the Configuration Control Board (CCB) on initial submission. (>85%)

Percent of documents with proper revision. (Audit basis >98%)

6-2.6 Purchasing. The minimum criteria for purchasing are contained in ISO 9001 paragraph 4.6. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria which must be met in the area of purchasing.

DISCUSSION/ADDITIONAL CRITERIA

The contractor shall have procedures that ensure the correct flowdown of policy, procedure, design, and technical requirements to subcontractors. The contractor system shall provide for the examination and verification of purchased parts to the extent necessary. A contractor to subcontractor feedback system shall be demonstrated.

The contractor shall have a vendor certification program. The contractor shall ensure that all vendors are informed of the programs existence and its requirements. The program procedures should address and/or describe the assessment and selection of subcontractors. The contractor shall develop and retain records demonstrating vendor selection, capability, and performance. Lot acceptance rates, on-time delivery, cost, and responsiveness should be factors in certification. Vendors are recognized for attaining certification, with an emphasis on long term partnerships. The contractor is encouraged to reduce the overall number of suppliers. Inspection of components from certified vendors is reduced or eliminated. Criteria for decertification of vendors exists.

ASSESSMENT CRITERIA

Does the contractor have a process for the assessment and certification of subcontractors, review of purchasing data, and the verification of purchased products?

Is the process producing the desired results?

Are records of subcontractor performance maintained and used in the selection process?

Does the contractor evaluate the quality system of subcontractors on a scheduled basis through vendor surveys, desk audits or on-site reviews?

Does the contractor review and approve purchasing documents for adequacy prior to release?

Does the contractor examine purchased product to verify contract compliance?

Are vendor ratings and certifications used to reduce required inspection levels?

METRICS

Percent of subcontractor shipments received with proper documentation. (>95%)

Percent of subcontractor shipments with overages/shortages. (<5%)

Percent of on-time deliveries. (>95%)

Acceptance rate of subcontractors shipments. (>95%)

Percent of vendors certified. (Increasing trend)

6-2.7 Control of Customer-Supplied Product. The minimum criteria for control of customer-supplied product are contained in ISO 9001 paragraph 4.7. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for control of customer-supplied product.

DISCUSSION/ADDITIONAL CRITERIA

Notification to the customer of product that is lost, damaged, or is otherwise unsuitable shall be documented and accomplished in a timely manner. Upon receipt, material shall be examined for damage in-transit, proper identification, and required quantity. The contractor shall provide for periodic inspection of stored material for deterioration. Stored material shall be properly identified to prevent unauthorized use.

ASSESSMENT CRITERIA

Does the contractor control purchaser supplied products?

Is the control process producing the desired results?

Does the contractor examine material upon receipt and during storage?

Are records of material examinations available?

Has the purchaser been notified in a timely manner of material which has been lost, damaged, or determined to be otherwise unsuitable?

METRICS

Percent of lost, damaged, or destroyed purchaser supplied product. (<2%)

6-2.8 Product Identification and Traceability. The minimum criteria for product identification and traceability are contained in ISO 9001 paragraph 4.8. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria which must be met in the area of product identification and traceability.

DISCUSSION/ADDITIONAL CRITERIA

The contractor should maintain a process for identifying material from receiving, storage, handling, and all successive stages of production, acceptance and delivery/installation. The process will provide traceability of individual assemblies, subassemblies, parts, lots or batches as appropriate. Identification can be accomplished using tags, travelers, bar coding or any other suitable and effective means.

ASSESSMENT CRITERIA

Does the contractor have a process for the identification and traceability of material?

Is the process producing the desired results?

Has material been identified to the applicable drawing, specification, or other documents, during all stages of design, production, or delivery, where appropriate?

METRICS

Metrics at contractor option.

6-2.9 Process Control. The minimum criteria for process control are contained in ISO 9001 paragraph 4.9. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for process control.

DISCUSSION/ADDITIONAL CRITERIA

The contractor shall demonstrate advanced planning to identify, evaluate, and control processes. Work instructions will be available for all activities throughout the manufacturing process. Processes will be controlled and the degree of control evaluated via statistical means.

Special processes will be performed under controlled conditions, including work instructions. Personnel performing special processes will have the appropriate training and all required certifications. The contractor shall demonstrate that the special process can meet the applicable requirements.

ASSESSMENT CRITERIA

Does the contractor assure process control?

Are process controls producing the desired results?

Are work instructions available throughout the manufacturing process?

Are work instructions adequate for use?

Are work instructions being followed?

Are qualified personnel, equipment, or processes utilized as required?

METRICS

First pass yield rate for individual product lines and the facility. First pass yield is the conforming outcomes divided by the total outcomes produced from a given process the first time through. (>98%)

Defects per million opportunities. ($\leq$2700)

6-2.10 Inspection and Testing. The minimum criteria for inspection and testing are contained in ISO 9001 paragraph 4.10. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for inspection and testing.

DISCUSSION/ADDITIONAL CRITERIA

The contractor assures that material received from subcontractors meets purchase order requirements. The contractor has a method to take appropriate action when subcontractor nonconformities are discovered. The contractor utilizes past inspection data to adjust levels of inspection.

The contractor quickly identifies nonconformities created in-process. Scrap and rework levels are low or declining.

Procedures for positive recall of material released prior to inspection or test results being available must be documented.

Inspection records should facilitate decision-making concerning product meeting requirements.

ASSESSMENT CRITERIA

Does the contractor have a process for inspection and test?

Is the process producing the desired results?

How is urgent production release material handled?

Are inspections documented and reviewed prior to final inspection and test?

METRICS

Percentage of lots accepted at Contractor Final Inspection or Test. (<98%)

6-2.11 Control of Inspection, Measuring, and Test Equipment. The minimum criteria for control of inspection, measuring and test equipment are contained in ISO 9001 paragraph 4.11. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for control of inspection, measuring and test equipment.

DISCUSSION/ADDITIONAL CRITERIA

Contractor shall comply with ISO 10012 or approved equivalent and all contract criteria. Calibration documentation will include records of actual measurements. The contractor will use historical data to adjust calibration intervals.

Contractor shall establish a Measurement and Test Equipment (M&TE) design review and approval system which provides for an independent review. Contractor shall establish guidelines for the development of M&TE designs. The contractor shall assure that production tooling/process instrumentation, if used as a medium of inspection, is proven for accuracy and included in the calibration system. The contractor shall provide for the independent review of designs for each inspection identified in the technical data package. Control of suitable resources, internal or external, used to design M&TE shall be assured. The contractor system shall provide for periodic review and revision of designs due to product drawing amendments or changes in measurement standards. Configuration control for unique or special M&TE shall be established.

ASSESSMENT CRITERIA

Does the contractor have a process which complies with ISO 10012 or equivalent?

Is the process producing the desired results?

Is measuring and test equipment periodically calibrated?

Are records of calibration maintained and do they include actual values?

Has the precision and accuracy of all measuring and test equipment been determined?

Are all gages traceable to calibration records?

Is test hardware or test software periodically checked to prove that they are capable of verifying the acceptability of products released for use?

METRICS

Percent of measuring and test equipment turned in for calibration or found with missing or illegible calibration labels. (< .5%)

Percent of turned in M&TE found to be out of calibration. (< 1 %)

Percent of M&TE turned in for calibration ontime. (99%)

Percent of M&TE designs approved by Government or independent reviewer on first review. (90%)

6-2.12 Inspection and Test Status. The minimum criteria for inspection and test status are contained in ISO 9001 paragraph 4.12. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for inspection and test status.

DISCUSSION/ADDITIONAL CRITERIA

Contractor's inspection and test program will positively identify the inspection or test status of product during all stages of the contractor's operation.

ASSESSMENT CRITERIA

Does the contractor have a process for assuring inspection and test status?

Is the process producing the desired results?

Does the contractor identify the inspection status of material to indicate conformance, nonconformance, or awaiting inspection?

Does the system identify the inspection authority responsible for the assignment of product status?

METRICS

Percent or number of incidents where documentation at final acceptance shows missing inspection or test points. (< .5%)

6-2.13 Control of Nonconforming Product. The minimum criteria for control of nonconforming product are contained in ISO 9001 paragraph 4.13. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for nonconforming product.

DISCUSSION/ADDITIONAL CRITERIA

Review and disposition of nonconforming product shall be accomplished by authorized personnel such as engineering, product assurance, manufacturing, and the Government representative if applicable. Reinspection of repair/reworked product will use documented procedures.

ASSESSMENT CRITERIA

Does the contractor have a process for control of nonconforming product?

Is the process producing the desired results?

Does the contractor control nonconforming material by segregating, identifying, and documenting the material?

Does the contractor have an established Material Review Board (MRB) process?

Does the MRB process include review by appropriate functional representatives including quality, engineering, manufacturing, and a Government representative?

METRICS

Overall number and dollar value of material review board actions, including preliminary review (decreasing trend). The following will be included:

- Material use-as-is.
- Material repaired.
- Material reworked.
- Material scrapped.
- Material returned to vendor.

6-2.14 Corrective and Preventive Action. The minimum criteria for corrective and preventive action are contained in ISO 9001 paragraph 4.14. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for corrective and preventive action.

DISCUSSION/ADDITIONAL CRITERIA

The contractor shall establish an effective corrective action process that provides for the prompt detection, correction, and prevention of adverse quality conditions. Corrective actions which have been implemented and determined to be ineffective will be evaluated by the next level of management.

ASSESSMENT CRITERIA

Does the contractor have a process for corrective and preventative action?

Is the process producing the desired results?

Does the contractor investigate the cause of nonconforming product and apply corrective action?

Does the contractor analyze process data, customer complaints, Quality Deficiency Reports (QDR), assessment reports, etc., to detect and eliminate potential causes of nonconforming product?

Does the contractor verify that corrective actions are effective?

Does the contractor implement and record changes in procedures resulting from corrective actions?

METRICS

Cycle time of internal corrective action requests (CAR). (Decreasing trend)

Number of QDRs and Administrative Contracting Officer (ACO) generated Corrective Action Requests received. (Decreasing trend)

Percent of corrective actions completed within schedule. (>95%)

6-2.15 Handling, Storage, Packaging, Preservation, and Delivery. The minimum criteria for handling, storage, packaging, preservation, and delivery are contained in ISO 9001 paragraph 4.15. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for handling, storage, packaging, preservation and delivery.

DISCUSSION/ADDITIONAL CRITERIA

Procedures for handling, storage, packaging, and delivery shall be in place to assure that products/items are functional and without deterioration, when needed by the user. Contractor will provide for special customer storage, handling, packaging and delivery requirements, including explosive safety, control of Surety Material, etc.

ASSESSMENT CRITERIA

Does the contractor have a process for handling, storage, packaging, and delivery?

Is the process producing the desired results?

Does the contractor have a system for assessing carriers?

Does the contractor evaluate stored material for deterioration at regular intervals?

METRICS

Percent or instances of product that is damaged because of inadequate handling, storage, packaging, preservation, or delivery. (Decreasing trend)

6-2.16 Control of Quality Records. The minimum criteria for control of quality records are contained in ISO 9001 paragraph 4.16. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for control of quality records.

DISCUSSION/ADDITIONAL CRITERIA

The contractor shall have a process that assures that quality records are generated and maintained. The records shall be complete, concise, retrievable, and adequately describe work accomplished during manufacturing, assembly, inspection, and tests performed. Records must be stored to prevent deterioration and have a definite retention time established. All records will be made available to the customer upon request.

ASSESSMENT CRITERIA

Does the contractor have a process for maintaining quality records?

Is the process producing the desired results?

METRICS

Metrics at contractor option.

6-2.17 Internal Quality Audits. The minimum criteria for internal quality audits are contained in ISO 9001 paragraph 4.17. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for internal quality audits.

DISCUSSION/ADDITIONAL CRITERIA

The contractor has an effective internal assessment process. Sufficient resources are provided to effectively assess all internal systems, programs, and processes. Personnel assigned to auditing receive appropriate assessment training. An assessment schedule exists and is adhered to. Assessment reports are comprehensive and are distributed to senior leadership of the company. Timeframes are established for implementation of corrective action required. Assessment reports are responded to by the auditee in a timely manner. Audits are closed out in a timely manner.

ASSESSMENT CRITERIA

Does the contractor have a process for internal audits?

Is the process producing the desired results?

Is there evidence of management review of and action on assessment findings?

Is assessment schedule adhered to?

Are corrective actions judged for effectiveness after implementation?

METRICS

Percent of internal audits completed per assessment schedule. (>95%)

Cycle time from assessment to acceptance of corrective action. (30 days) (Decreasing trend)

6-2.18 Training. The minimum criteria for training are contained in ISO 9001 paragraph 4.18. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for training.

DISCUSSION/ADDITIONAL CRITERIA

The contractor must have an effective training process. Management must assess the needs and provide for the training of all personnel and assure that proper records are kept. Training shall include administrative, quality, and technical functions as necessary.

ASSESSMENT CRITERIA

Does the contractor have a process for providing training?

Is the process producing the desired results?

Have positions requiring specialized training been identified?

Are personnel performing special functions properly qualified or certified?

METRICS

Percentage of employees trained on schedule according to training plan. (Increasing trend)

6-2.19 Servicing. The minimum criteria for servicing are contained in ISO 9001 paragraph 4.19. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for servicing.

ASSESSMENT CRITERIA

When servicing is required, are results evaluated against contractual requirements?

METRICS

Metrics at contractor option.

6-2.20 Statistical Techniques. The minimum criteria for statistical techniques are contained in ISO 9001 paragraph 4.20. The following paragraph(s) contain(s) (CP)2 enhancements and/or additional criteria for statistical techniques.

DISCUSSION/ADDITIONAL CRITERIA

Active, effective utilization of Statistical Process Control (SPC) exists. The SPC process contains provisions for--

Management Commitment to SPC
Organizational Structure
SPC Training
Vendor SPC
Criteria for Use of SPC
Process Capability Studies
Control Chart Policies
Measuring and Test Equipment
SPC Records
SPC Assessment and Review
Elimination/Reduction of Inspection
SPC Computer Hardware/Software Application

Detail SPC applications for individual products are developed and implemented. Reliance on inspection and test is minimized due to SPC implementation.

Other additional statistical techniques must be effectively implemented and be appropriate for the contractor's operation.

ASSESSMENT CRITERIA

Does the contractor have a process for SPC training?

Is the process producing the desired results?

Does the SPC process address all required elements? (See above)

Has the contractor developed individual product SPC applications?

Are inspection levels reduced when SPC data supports it?

Do the SPC applications provide for definition of which characteristics will be SPC candidates?

METRICS

Total number or percent of processes utilizing SPC broken out by variable and attribute. (Increasing trend)

Total number or percent of processes evaluated/flowcharted for use of SPC. (Increasing trend)

Total number or percent of processes having process capabilities (Cp) and process performance indices (Cpk) broken out as follows:

<1.33
>1.33 but <2.00
>2.00

Percent of vendors with approved SPC plans. (Increasing trend)

Percent of employees trained in SPC techniques, broken out by job function. (>80%) (Increasing trend)

Number of characteristics submitted and approved where SPC was utilized for product acceptance in lieu of sampling inspection. (Increasing trend)

6-3. ADDITIONAL ASSESSMENT ELEMENTS

The following elements are in addition to ISO 9001 and must be satisfied in order to achieve certification.

6-3.1 Customer Satisfaction

Contractor assures that all levels of the organization are aware of who their customers are - internal and external. A formal channel for customer communications is established. Product complaints and responses are documented and available for review. Responses should be timely and customer-oriented, with follow-up if necessary. Customer satisfaction should be measured via customer surveys and other means.

ASSESSMENT CRITERIA

Has the contractor identified internal and external customers throughout the organization?

Does the contractor communicate with external customers outside of responding to complaints?

Do customer surveys prompt action?

METRICS

Number of customer complaints. (Decreasing trend)

6-3.2 Quality Costs

The contractor shall collect and maintain financial costs of the quality program as a percentage of total costs. Costs to be collected, with examples shown in parentheses are as follows: prevention (training, auditing, vendor visits, etc.); appraisal (inspection, test, x-ray, etc.); and failure (scrap, rework, screening, warranty, etc.). Records should show management review and assessment of quality cost data.

ASSESSMENT CRITERIA

Does the contractor collect and use quality cost data?

Has the contractor implemented the quality cost process?

Is the process producing the desired results?

Does the contractor maintain all pertinent quality cost data?

How is the quality cost data made available to appropriate Government customers?

METRICS

Total quality costs broken out by types. (<10%)

6-3.3 Warranty Performance

A documented warranty processing system exists with a central point of contact established and communicated to appropriate customers. The contractor's warranty process is similar to the quality deficiency report process with a minimum of administrative criteria. The contractor is amenable to receiving warranty claims and is cooperative in developing and implementing corrective action, in a timely manner. The contractor assumes responsibility for appropriate costs.

ASSESSMENT CRITERIA

Does the contractor effectively process warranty claims?

Has the contractor implemented a warranty claim process?

Is the process producing the desired results?

Has the contractor point of contact been communicated to applicable customers?

Are customers satisfied with the disposition of warranty claims?

Is there a file containing open warranty claims?

METRICS

Warranty restitution rate.
Cycle time for close-out of warranty claims. (Decreasing trend)

6-3.4 Ethics

The contractor shall have an ethics or standards of conduct policy which is communicated to employees at all levels. Employees acknowledge awareness of and pledge adherence to the company's ethics policy. The policy should specifically mention business relationships with government employees.

ASSESSMENT CRITERIA

Is ethics policy communicated to all employees?

METRICS

Metrics at contractor option.

6-3.5 Business Planning

The contractor's business strategy should be clearly demonstrated through the performance of short and long-term business planning. Continuous improvement in quality and productivity is part of business planning. Business plans are evaluated and updated regularly.

ASSESSMENT CRITERIA

Do business plan records reflect consideration of continuous improvement?

Does the contractor have a business plan which is reviewed and updated regularly?

METRICS

Metrics at contractor option.

6-3.6 Safety

The contractor has established an effective safety process which is communicated to employees at all levels. Personnel are provided with appropriate protective equipment. Employees have a means to report unsafe practices. The contractor has evidence that they comply with all applicable Federal, State, and Local safety regulations.

ASSESSMENT CRITERIA

Does the contractor have a process for assuring plant safety?

Is the process producing the desired results?

METRICS

Number of lost time accidents. (Decreasing trend)

6-3.7 Environmental

The contractor has established an effective environmental compliance process. The contractor should have appropriate environmental equipment to control hazardous output of production processes. Employees have a means for reporting environmental problems. The contractor has evidence that he complies with all applicable Federal, State, and Local environmental regulations.

ASSESSMENT CRITERIA

Does the contractor have a process to address environmental control and compliance?

Is the process producing the desired results?

METRICS

Number of notices of violation. (Decreasing trend)

6-3.8 Continuous Improvement Process (CIP)

The contractor shall have a Continuous Improvement Process which is maintained by Senior Management. It shall contain, as a minimum, a policy statement from management on the need for continuous improvement, a number of short range and long range goals, and the appropriate metrics to measure trends. Major findings from the (CP)2 assessment and their metrics shall be tracked in the CIP. Additional key indicators used by contractor should also be included, as well as the "What, When, Who, and How" for each. The CIP should be a flexible document and change as new areas for improvement develop. The CIP forms unique guidelines for reaching out beyond (CP)2 certification, and enables the contractor to demonstrate effective self-audit and continuing drive for improvement. Contractor will report on progress of the continuous improvement plan and achievement of goals to the lead MSC at least semiannually.

ASSESSMENT CRITERIA

Does the contractor have a Continuous Improvement Process?

Is the process producing the desired results?

The proponent of this pamphlet is the United States Army Materiel Command. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to the Cdr, HQ AMC, ATTN: AMCRD-IEE, 5001 Eisenhower Avenue, Alexandria, VA 223330001.

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TACOM/AMSTA-DRM (4)
TECOM/AMSTE-CT-N (4)

APPENDIX A

GOVERNMENT BENEFITS

The Government gains many benefits from the (CP)2 efforts. Perhaps the biggest benefit is the overall cost savings that will result as contractors improve their processes. This improvement yields higher quality products and services and reduces cycle time. Certified contractors in general will provide less expensive products and have fewer contractual problems. This means not only lower cost contracts but also lower support costs and lower life cycle costs since product from certified contractors meets intended field criteria.

In addition to the cost savings, the Government benefits from improvements in the acquisition cycle. The teaming that is formed in the certification process leads to a more cooperative contracting relationship. The Government has the opportunity to encourage improvement of the contractor's processes. This yields higher confidence in the contractor and a better overall system.

Additional benefits accrue to the Government as unnecessary criteria and oversight are eliminated from contracts. The following additional benefits can be gained.

a. Reduction of Development Test Criteria.

A major thrust in the development phase is to reduce the cost of developmental testing. Through the Test Integration Working Group (TIWG), the Government and all concerned parties thoroughly assess and plan the testing for an item. The TIWG takes many factors into account in detailing a test plan. Among these are the amount of in-house testing a contractor has performed, the simulation and modeling performed, the history of the item and the design. As more confidence is gained in a contractor who has thoroughly planned and taken advantage of some of the modern tools and has demonstrated sound performance, the TIWG will be in the position to reduce the amount of testing that is required for validation of the item.

b. Eliminate Quality Assurance (QA) Preaward survey.

Based on current certification, the Government will not have to perform a preaward quality assurance survey on various contractors. Due to the extensive assessment performed during (CP)2, the contractor's system has been thoroughly assessed; therefore, a preaward survey would

be redundant and of little value. The contractor can be given a positive QA finding with little to no risk to the Government, thus saving time and money.

c. Adjustment of Contract Administrative Activities - Reduction of Oversight for Certified Contractors

In this age of decreasing manpower, the (CP)2 allows the Contract Administrative function to adjust their workload to spend more time with contractors who have a greater need. This can be done with the confidence that the certified contractor will still perform to the contractual criteria. In addition, a major reduction in oversight by MSC QA personnel occurs at a certified contractor. For example, quality program audits are eliminated, visits to the contractor are reduced, and some mandatory inspections are removed.

APPENDIX B

CONTRACTOR BENEFITS OF (CP)2 CERTIFICATION

a. There are many benefits that a contractor gains from participating in (CP)2. Even without any change in the way the Government does business, the contractor stands to gain certain benefits. These are addressed in this appendix.

b. Perhaps the greatest benefit to a contractor from the (CP)2 process is the improvement that occurs in his processes and procedures. The (CP)2 process drives contractors to improve their processes, and then to continue improving these after certification. The result of improved processes is seen in the metrics used as an overall improvement of the contractor's efficiency. Savings are seen in reduced scrap, rework, cycle times, elimination of non-value-added efforts, and overall increase in yields and the quality of end items. Developmental efforts result in a more defined design process, reduced cycle times in development, better use of up front concurrent engineering to eliminate costly oversights, and an overall increase in the probability that development efforts will be successfully completed as planned. These increases in efficiency should lead to an improved competitive process and overall lower costs.

c. The contractor gains the ability to have the Government participate on a noncontractual basis and team with them to provide a customer viewpoint of where they can improve their process. With (CP)2, the Government assesses the contractor and then assists him at his request in correcting the processes. This simplifies the process for the contractor as well as assures the Government that they will be satisfied with the results. Additionally, the Government may also comment on areas that need improvement. Prior to (CP)2, the Government would have been unable to influence a system that met minimum criteria of the contract. This leads to better systems and a more satisfied customer.

d. Customer satisfaction is improved for certified contractors. The (CP)2 process allows the contractor to form a teaming and partnering arrangement with the Government in a noncontractual environment. This fosters the overall DOD initiative to team/partner with contractors. In many cases, this may be the first time the contractor and Government work together to improve the contractor's processes. This mutual effort builds trust between both parties that will carry over into future contracts.

e. There are several areas of potential recognition for a certified contractor. The simple act of the Government declaring a contractor an excellent contractor has many advantages. The contractor has the right to advertise his certification. As part of the certification, the contractor is awarded a plaque and flag that signifies that the Army has recognized him as an excellent contractor. This recognition may be used by potential customers when deciding whether to place orders with the company.

f. The certification process and award have been shown to be a morale builder for the contractor's employees. The program stresses empowerment that is assessed to assure that people throughout the organization are used to their fullest. Employees also view the Government in a different light as both parties work together. The overall teaming concept gives the employee a sense of ownership and pride. The overall workforce is recognized in many ways. One of the primary methods of recognition is the award ceremony. The ceremony is a tribute to the employees of the company, and employee recognition normally occurs that day in various ways. This ceremony is also an opportunity for the contractor to receive publicity. Although the ceremony is for the Government to present the award, the contractor is given the opportunity to orchestrate the ceremony. They make all local arrangements for publicity and attendees. Typically this includes inviting local media, local/state/federal government representatives, buying activity representatives, and whoever they feel is appropriate.

g. ISO 9000 standards are the foundation of the (CP)2 process. These relatively new International Standards for quality are rapidly replacing other current standards in use. Certification under (CP)2 is a recognition by the Army that the contractor meets all the criteria of the appropriate ISO standard. The (CP)2 includes all elements of the ISO standards and goes far beyond these in many areas. There is potential for the Government to issue ISO certifications in the future based upon (CP)2 certification. This is now being addressed at some MSCs as the Government begins to use the ISO standards more.

h. When the Government requires functional requirements be integrated into a single Engineering Master Plan, (CP)2 certified contractors will be more capable of producing an integrated functional effort. The (CP)2 assessment processes include compliance verification in all areas related to quality and quality management. During this process, the Government gains extensive, detailed knowledge of the contractor's quality capabilities. A contractor must excel in all elements of (CP)2 to achieve certification. This allows the contractor to easily integrate his proposal and save the additional duplication of proposal documents. The Government also saves the review time.

APPENDIX C
INCENTIVES FOR CONTRACTOR PERFORMANCE CERTIFICATION

INCENTIVE NO. 1

First Article Test Waiver/Reduction

INCENTIVE:

The Government waives First Article Test (FAT) criteria under the following conditions:

- o The certified contractor produced the same/or similar item in the past.
- o There is no recent adverse quality data on the item.

The buying activity decides whether an item is the same or similar and if an adverse trend exits. If FAT is required for a certified contractor, any technical data package test criteria considered unnecessary for a certified contractor will be deleted. This will be defined in the solicitation.

DISCUSSION:

Certified contractors have demonstrated their commitment to producing a quality product and their production capabilities during the certification process. Waiver of first article test criteria allows the certified contractor to determine his own essential preproduction test criteria that assure he will produce conforming product. Unnecessary and duplicative testing costs are eliminated; the Government also benefits from expedited deliveries and reduced oversight/review criteria. Recognizing the high level of confidence developed in certified contractors via the certification process, MSCs should strive to minimize First Article criteria for certified contractors to the fullest extent possible.

Lot Acceptance testing remains in place to assure that the production process yields conforming materiel. Where a new producer is involved or there is other justified concern over the risk of relying on Lot Acceptance Testing in lieu of First Article Test, use of a reduced First Lot size can be considered.

The following philosophies should be followed in limiting first articles when it is decided that some reduction is warranted:

a. Avoid duplicating any inspections/tests that are in lot acceptance inspection/test.

b. Avoid piece part inspection and subassembly testing where the contractor normally would be expected to control these in production even without a formal inspection/test requirement. Note that the technical data package (TDP) still includes these criteria; therefore, the contractor must assure themselves that the product meets all technical criteria. A quality producer will perform these or similar inspections, even in the absence of government oversight.

c. Combine First Article criteria with first production lot acceptance test in order to eliminate the entire First Article test. There is a real cost and time savings involved in eliminating the First Article. Production lot sizes can be adjusted to reduce risks of excessive quantities being built prior to test.

d. If First Article is required, eliminate the need for government witnessing of in-house testing. The certified contractor should be trusted to perform his own tests, and this puts the responsibility squarely on the contractor. It also saves time.

e. Reduce test quantities/times to demonstrate acceptability. Remember that confidence is established in certified contractors.

Any relaxation of the First Article provisions for (CP)2 certified contractors will be defined in the contract solicitation.

The bottom line is that (CP)2 certified contractors are quality producers who maintain a process that is dedicated to making decisions in the best interest of the government. Under the teaming/partnering strategies being executed at all levels of DOD, criteria should be reduced to those that are absolutely necessary. Teaming with (CP)2 contractors gives us the opportunity to do this. It is clear that through teaming, more trust will be placed in contractors which obviously carries with it increased risks. These risks are best mitigated by working with our contractors with programs such as (CP)2. Since the final decision is left up to the buying activities, these risk levels can be set on a case-by-case basis.

INCENTIVE NO. 2

Waiving Government Review of Acceptance Inspection Equipment (AIE) Design by the Government

INCENTIVE:

The Government will not require (CP)2 certified contractors to request approval for AIE designs, or to submit certifications of conformance for AIE except in the following circumstances:

o When the buying activity determines it is Special AIE. (See chapter 2 definitions.)

o When characteristics that the AIE will check are classified as critical or special. (See chapter 2 definitions.)

o The Government needs AIE designs to develop additional equipment to support follow-on tests and field use.

The buying activity will handle these exceptions on a case-by-case basis.

DISCUSSION:

Some MSCs may require their contractors to submit designs for AIE, used to inspect or test items per detail item specifications, to the Government for review and approval prior to use. This may include special test/inspection equipment, and standard measuring and test equipment. This incentive only applies where designs are required to be submitted.

Certified contractors have been assessed to determine if they properly control the designs of their Acceptance Inspection Equipment. A thorough assessment is performed to assure that the contractor is aware of his responsibilities, that he is knowledgeable of Government design criteria and that he has an acceptable system to design, modify, and maintain designs.

In the past many contractors have had poor performance records as far as first time approval of submitted designs. Many appeared to use the Government review as a sounding board rather than assure that the equipment was meeting its intended criteria. By assuring the contractor devises a system to meet all criteria, then the Government would be in a position to back away from their oversight role and allow the contractor to govern his own process. This would reduce effort by the government thus providing a substantial savings to the Government while allowing the contractor to control his own schedule.

INCENTIVE NO. 3

Contractor Use of Statistical Process Control without Prior Government Approval

INCENTIVE:

The Government will not require a (CP)2 certified contractor to seek our approval before switching from a sampling inspection plan to a Statistical Process Control (SPC) approach.

DISCUSSION:

SPC is a key element of the (CP)2 certification process. This incentive allows the certified contractor the latitude to revise the approach from sampling inspection to SPC without having to seek government approval to do so. This action requires timely written notification to the ACO and Procurement Contracting Officer (PCO) when a decision is made to switch.

This approach will eliminate the necessity for a government mandated and unique sampling inspection approach and provide the contractor the latitude to take advantage of SPC to focus on control of processes and promote the continuous improvement philosophy.

(CP)2 certified contractors have demonstrated the capability to plan and implement effective SPC programs. This incentive recognizes the contractor commitment to advance planning, the ability to identify important issues and characteristics, and allows the contractor the latitude and flexibility to identify and take action in important program areas without requiring government direction and approval to do so.

INCENTIVE NO. 4

Reduction of Deliverable Data Approval Criteria
Data Requirement List (CDRL) Documents

INCENTIVE:

The Government will not require a (CP)2 certified contractor to submit quality assurance deliverable data directly related to the contractor's planning and implementing of his quality assurance process. A short list of examples follows:

- Product Assurance Program Plan.
- Quality Program Plan.
- Inspection System Plan.
- Certification Data Sheets.
- Statistical Process Control Plan.
- Cost of Quality Reports.

DISCUSSION:

(CP)2 certified contractors have demonstrated the ability to conduct effective quality planning and to develop and implement a process based on continuous process improvement. The requirement for the contractor to accomplish this activity will be contained in the contract scope of work, and will be available for government on-site review. The contractor will have the latitude to develop his process in his own format, thus reducing the requirement for "military" unique documentation and relieving the contractor of the requirement to seek the government's approval for how they design, implement, and revise the ongoing quality process. This approach to reducing the volume of contractually required deliverable data compliments the Army Materiel Command Acquisition Streamlining efforts to reduce the number of CDRLs in contracts.

The contractor will still be required to respond to customer complaints and Quality Deficiency reports, Test incident Reports and other issues relative to the performance of goods and services the government procures.

INCENTIVE NO. 5

Flow Down of Incentives to (CP)2 Certified Subcontractors When Prime Contractor is Not Certified

INCENTIVE:

The Government allows a prime contractor, who is not (CP)2 certified, to flow the following incentives down to a subcontractor who is (CP)2 certified for the appropriate technology area:

- o First Article Test Waiver/Reduction.
- o Waiver AIE Review Criteria.
- o Contractor Use of SPC Plans.
- o Reduction of Number and Scope of Deliverable Data Approval Criteria.
- o Reduction of Proposal Submissions.
- o Elimination of Quality Performance Risk Evaluation.

The benefit is to only reduce subcontractor effort. The incentives do not apply directly to the prime contractor. This does not relieve the prime contractor of meeting all his contractual criteria and assuring the conformance of goods/ services the subcontractor provides.

DISCUSSION:

Certified Contractors, whether a Prime or a Subcontractor, have demonstrated an effective control system and a continuous improvement philosophy which give the Government confidence that applying the above incentive will not increase risks significantly. Even though the Government does not contract directly with subcontractors, they have demonstrated necessary controls and have shown that they have the management philosophy to do what's right even when faced with outside influence. Therefore, although the Government may not have the same confidence in the prime contractor, benefits can still be extended to subcontractors. The prime contractor may choose at his option to extend these incentives or not. If his relationship with his subcontractors preclude these incentives he needs not offer them. These incentives encourage all our primes to deal with certified subcontractors since this will reduce their efforts and costs.

By using this incentive, it allows the Government to gain the benefits of dealing with certified subcontractors as well as allows certified contractors to compete for subcontract work. Since a lot of smaller companies are both prime contractors and subcontractors, this allows them to work to the same system in both cases. The benefits apply strictly to the certified subcontractor. The uncertified prime can satisfy the criteria by naming the subcontractor in use and the details of his certification.

APPENDIX D

DETAILED ASSESSMENT REPORTS

Detailed Assessment Reports are used by Assessment Team members to record findings and observations during the assessment. Findings and observations include areas of nonconformance uncovered, as well as observations of positive aspects of the contractors' operation. The findings should state the observed situation objectively and reference any document that gives the evidence of nonconformance. All observations should be witnessed by a contractor representative who should verify the content of the observation. The team and/or team leader should then classify the findings. All 28 assessment elements must be documented through the Detail Assessment reports. This includes elements found to be in total conformance to the assessment criteria for a particular element. At a minimum the documentation for a given assessment element will address all of the identified assessment criteria for that element.

A **major** finding is characterized by a demonstrated total absence of a necessary control element throughout the organization, or the particular elements were demonstratably inadequate, or where the number of failures of a particular control element in different areas clearly indicate a failure of the system or where the lack of or inadequacy of a particular control element impacts the acceptance of nonconforming hardware. A **significant** finding is characterized by a demonstrated absence of a necessary control element in one area of activity or the failure of a particular control element in one area of activity which is judged as an unacceptable risk or a number of minor non-compliances when considered in total are judged as an unacceptable risk. A **minor** finding is a system lapse of a minor nature. Each finding becomes a part of the final assessment report and is used by the team and/or team leader to rate conformance to each of the applicable elements.

Once the assessment reports are received the contractor is to fill out the planned action section, including estimated date of completion and responsible authority. The contractor will then return the reports to the team leader, who will determine the suitability of the planned action and verify its completion and effectiveness at a future in-process assessment.

ASSESSMENT RATING SCHEME

A numerical rating scheme will be used to assure that the contractor is worthy of certification. All findings in an assessment area will be reviewed by the team leader. If necessary, the team leader will discuss findings with team members, prior to assigning a rating to that area. Based on the number and severity of the findings, and importance of the area under review (i.e., Management Responsibility), the team leader will assign a rating of 0 to 10 for that area. The ratings will be recorded on the Assessment Ratings Summary Report. The numerical values are explained below:

RATING SCALE

RATING	RATING DEFINITION
0	This element is absent from the contractor's system.
1-2	This element is included in the contractor's system, however, both procedures and compliance require major improvement.
3-4	This element is included in the contractor's system and the procedures are generally adequate. However, compliance for this element requires substantial improvement.
5-7	This element is included in the contractor's system and the procedures are adequate. Compliance is generally adequate, however, some findings were identified which require improvement.
8-9	This element is included in the contractor's system. Procedures are very good and compliance is high. System fully meets customer criteria.
10	This element is included in the contractor's system. Procedures and compliance are very thorough and exceed customer criteria.

In order to become certified, a contractor must achieve a minimum rating of 8 in each area assessed. However, the contractor is encouraged to strive for the highest rating (10) and once certified, maintain an effort of continuous improvement.

$(CP)^2$ DETAIL ASSESSMENT REPORT

(AMC-P 715-16)

Assessment Date:
Detail Report Number:

Facility: **Site:**

Location:

Requirement:

Observations/Findings:

Assessor:
Observation Observed by:

Classification of Non-Compliance or Weakness:

Major _____ **Significant** _____ **Minor** _____ **Positive Observation** _____

Team Leader:

Planned Action: (Section to be completed by Contractor following Outbriefing by Assessment Team Leader)

Estimated Date of Completion:
Responsible Authority:

Remarks: (Section to be completed by Assessment Team Leader after reviewing the Planned Actions of the Responsible Authority)

DATE: **Team Leader:**

$(CP)^2$ ASSESSMENT RATINGS SUMMARY REPORT

(AMC-P 715-16)

ISO Elements — Assessment Dates: / Ratings:					Assessment Report Numbers
4.1 Management Responsibility					
4.2 Quality System					
4.3 Contract Review					
4.4 Design Control					
4.5 Document Control					
4.6 Purchasing					
4.7 Purchaser Supplied Product					
4.8 Product ID and Traceability					
4.9 Process Control					
4.10 Inspection and Testing					
4.11 Inspection Measuring and Test Eqpt.					
4.12 Inspection and Test Status					
4.13 Control of Nonconforming Product					
4.14 Corrective Action					
4.15 Handling, Storage, Packaging & Del.					
4.16 Quality Records					
4.17 Internal Quality Audits					
4.18 Training					
4.19 Servicing					
4.20 Statistical Techniques					

Other Elements

Ratings:					
Customer Satisfaction					
Quality Costs					
Warranty Performance					
Ethics					
Business Planning					
Safety					
Environmental					
Continuous Improvement Plan					

Ratings: 0-10

0. Element not addressed.

1-2. Element addressed but procedures and compliance need major improvement.

3-4. Element addressed and procedures are generally adequate but compliance requires major improvement.

5-7. Element addressed and procedures are adequate. Compliance is generally adequate but instances were noted that require improvement.

8-9. Element is addressed. Procedures are good and well complied with. Customer requirements are met.

10. Element is addressed. Procedures and compliance are thorough and exceed all customer requirements.

DESIGN & DEVELOPMENT SUPPLEMENT
$(CP)^2$ ASSESSMENT RATINGS SUMMARY REPORT

(AMC-P 715-16)

Elements Assessment Dates: Ratings:					Assessment Report Numbers
Design Process Control					
Design Planning					
Technical Risk Management					
Concurrent Engineering/IDP					
Supplier relationships					
Producibility					
a. Design Trade-off Studies					
b. Critical Characteristics/Process ID & Control					
c. Variability Reduction					
d. Prototype Manufacture					
Design Reviews					
FAPCAS					
Simulation, Test and Analysis					
Software Development					

Ratings: 0-10

0. Element not addressed.

1-2. Element addressed but procedures and compliance need major improvement.

3-4. Element addressed and procedures are generally adequate but compliance requires major improvement.

5-7. Element addressed and procedures are adequate. Compliance is generally adequate but instances were noted that require improvement.

8-9. Element is addressed. Procedures are good and well complied with. Customer requirements are met.

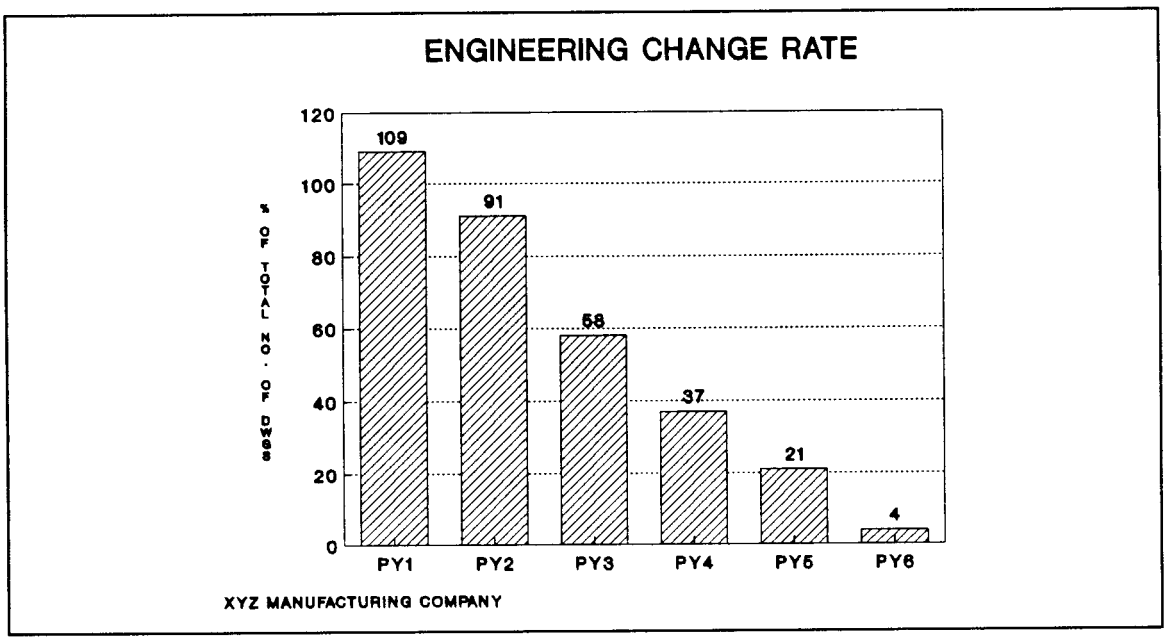
10. Element is addressed. Procedures and compliance are thorough and exceed all customer requirements.

AMC Form 2882-b
Jul 95

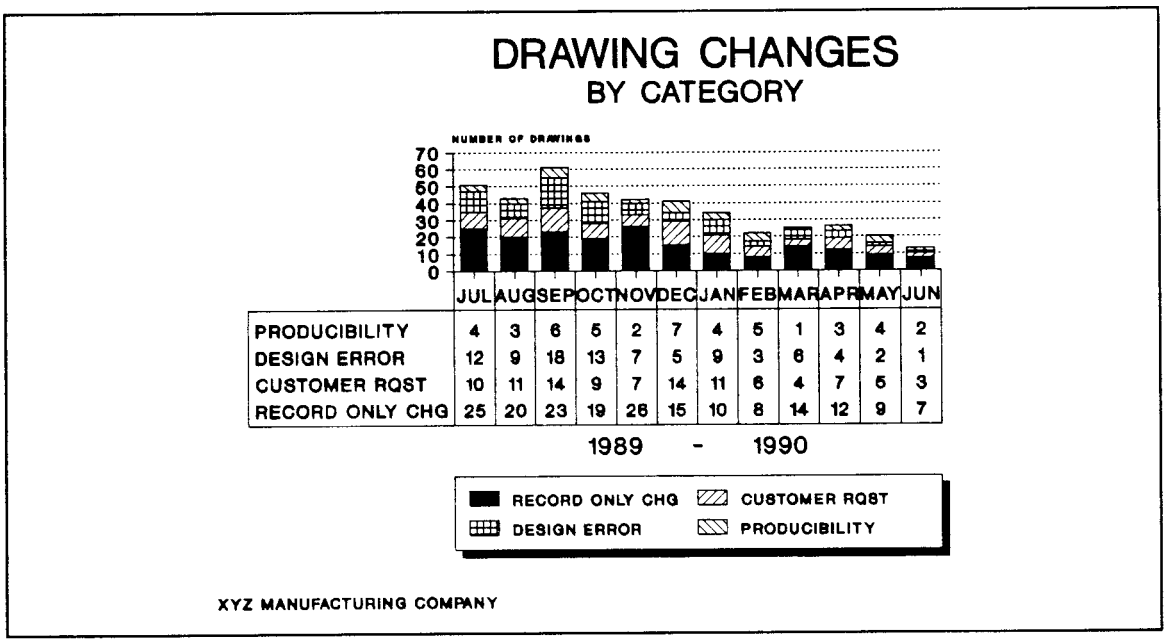
This form replaces AMC Form 2882,a,b,c,d-R-E, dtd 1 Jul 92.

APPENDIX E

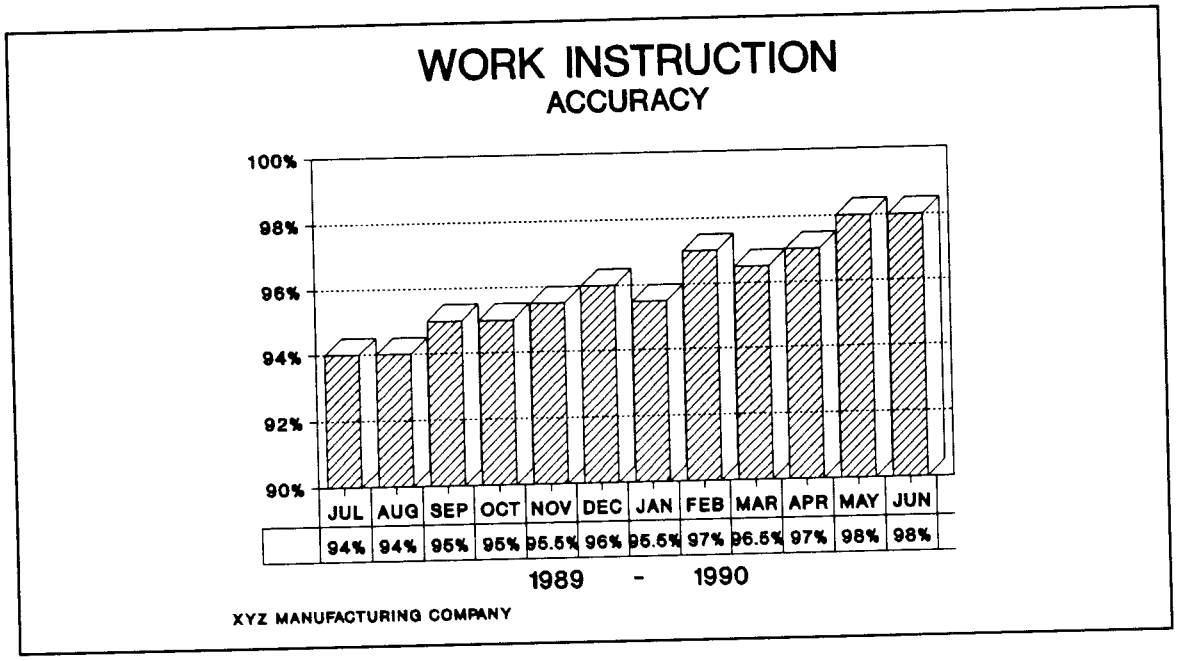
EXAMPLE CHARTS FOR METRICS



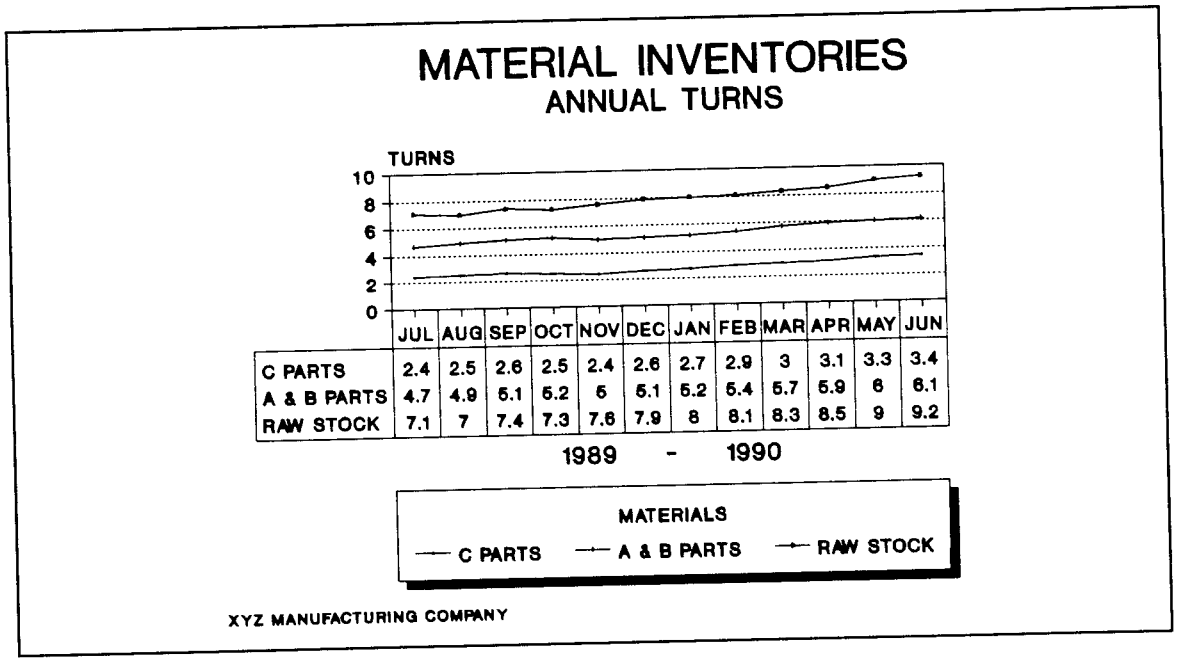
This chart reflects a high rate of drawings changes after production was started. A major cause of turmoil on shop floor including increased cycle times and higher costs.



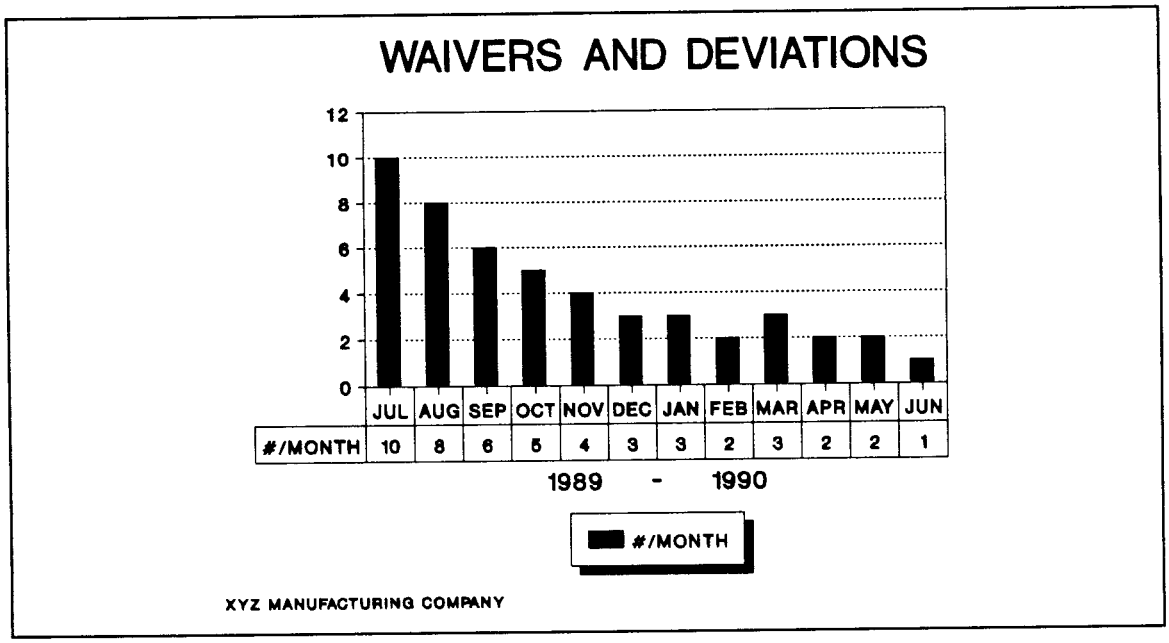
This type of chart provides information on the design maturity and visibility relative to the cause of engineering drawing changes.



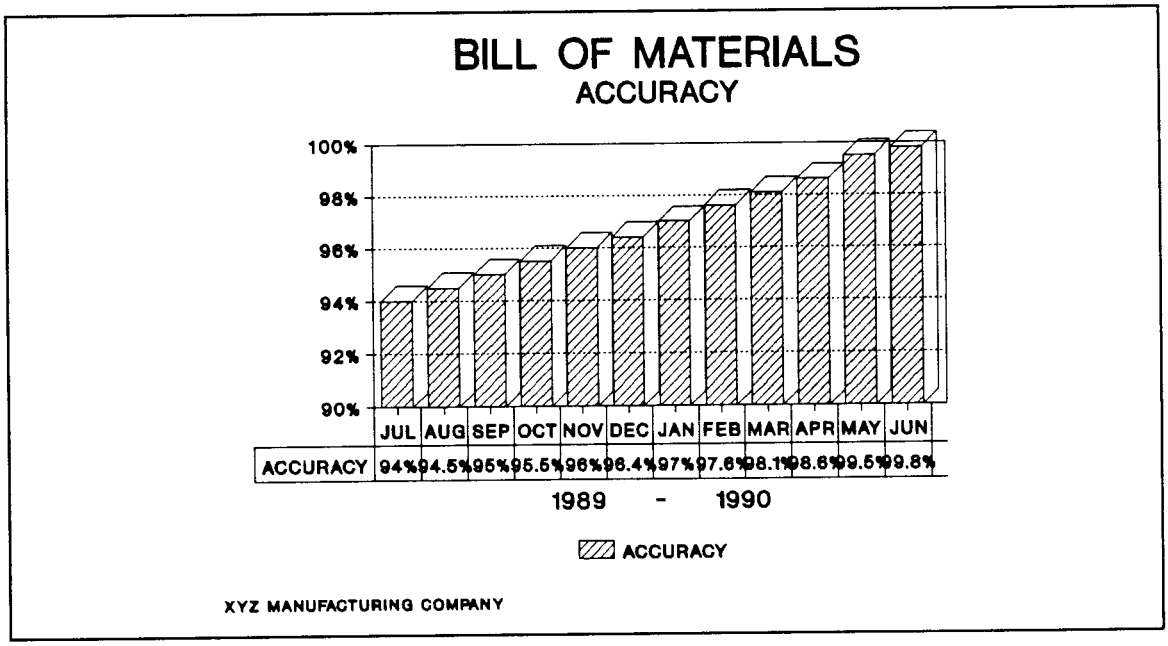
This chart illustrates a steadily improving Work Instruction accuracy from 94 percent to a near perfect condition in 12 months.



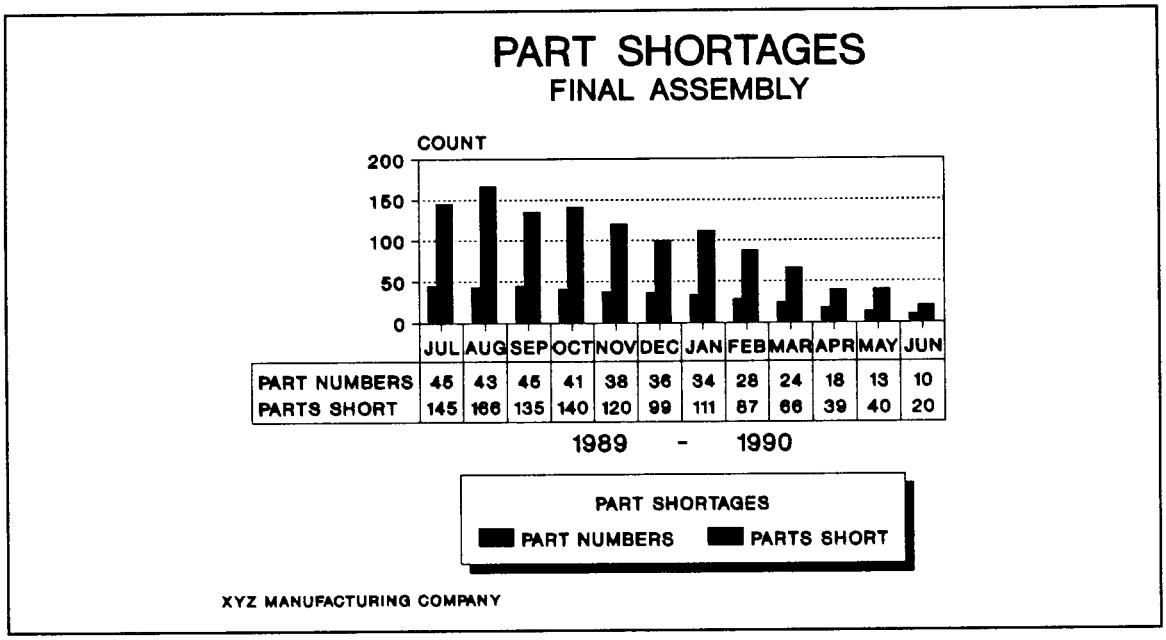
This chart shows annualized turns improving in all types of inventories from low cost C to high cost A and B and raw material items.



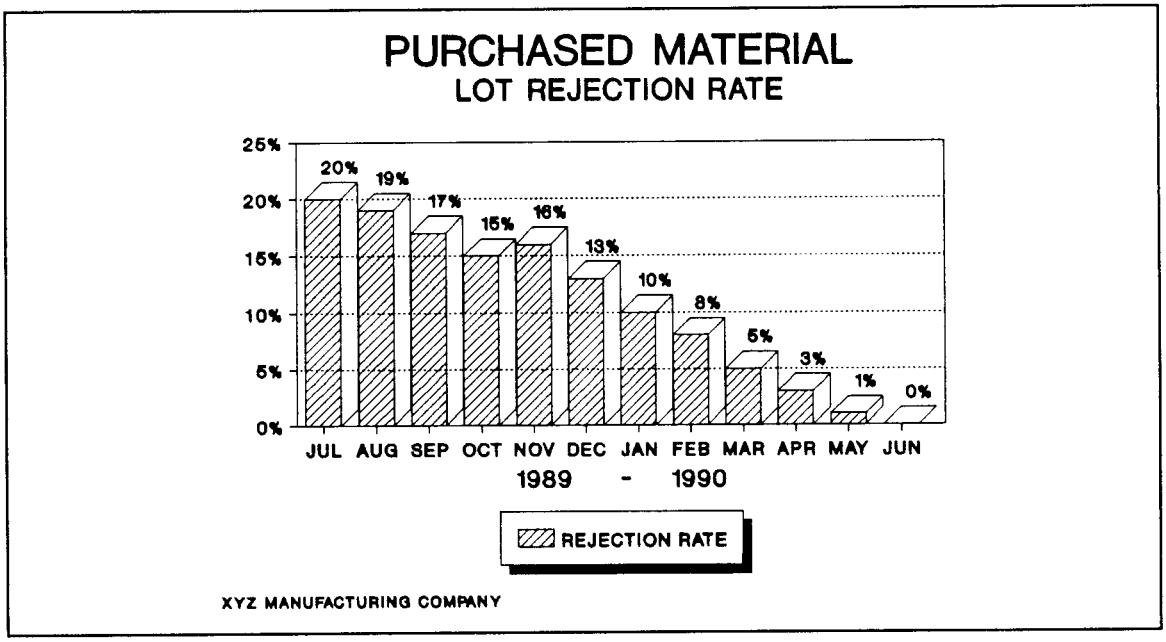
This type of chart can be used to reflect a favorable (or unfavorable) trend in regard to the level of waiver and deviation activity.



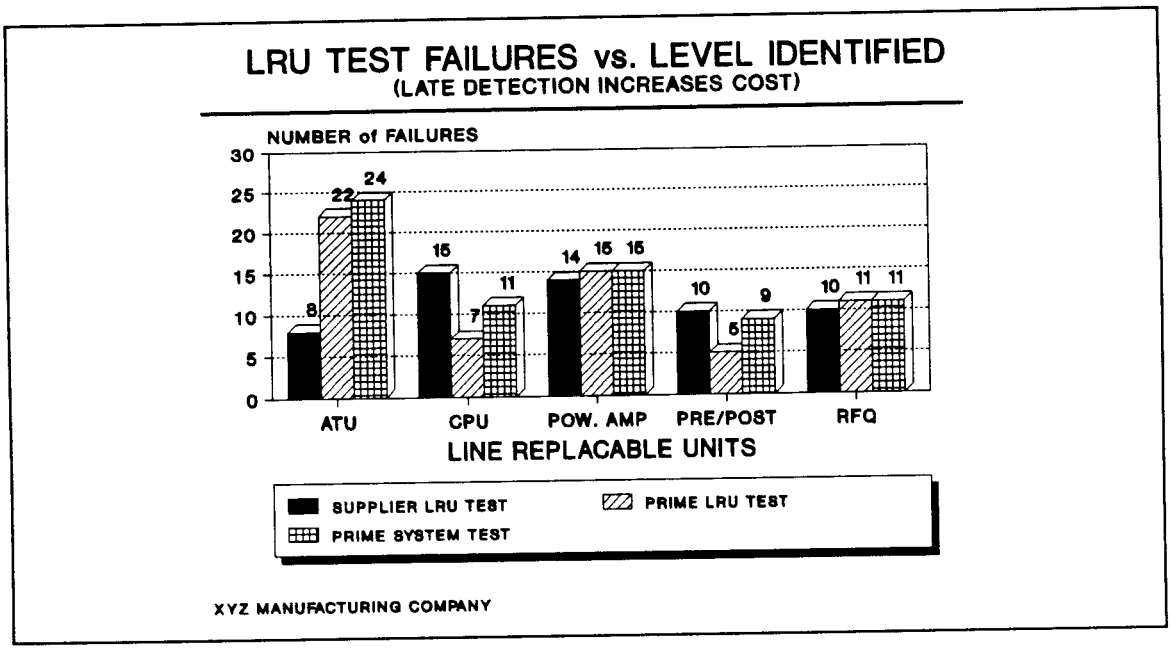
This chart shows rapid improvement of Bill of Material accuracy during the 12 month period to a near perfect condition.



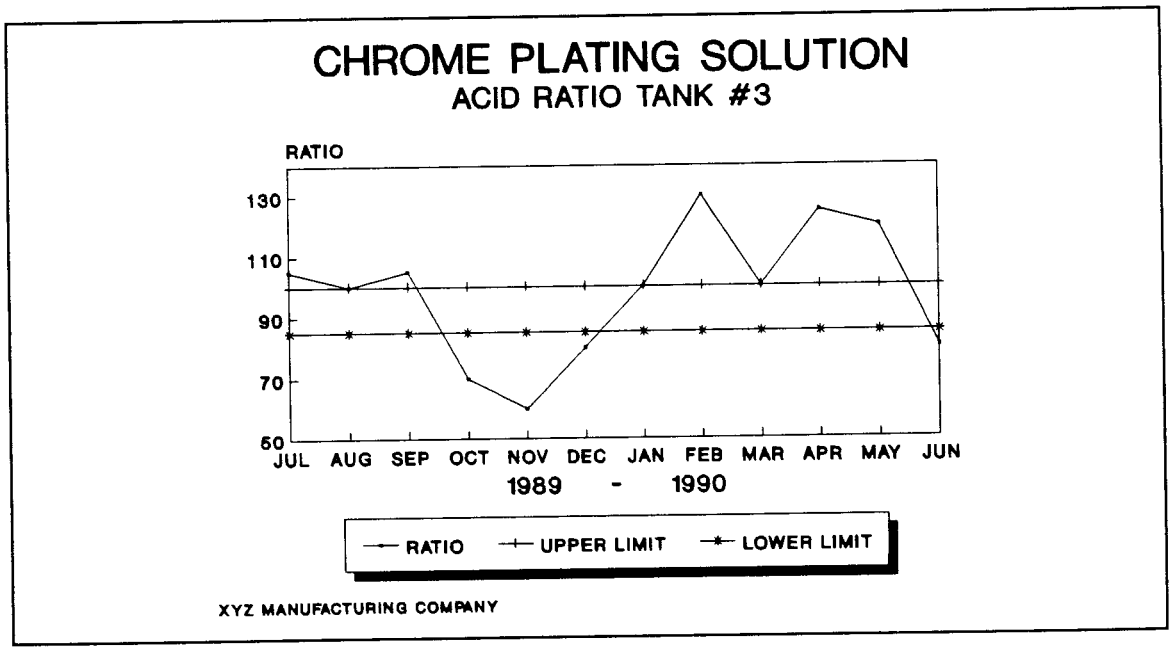
This chart shows steady reduction in part number shortages and total part shortages to the final assembly line.



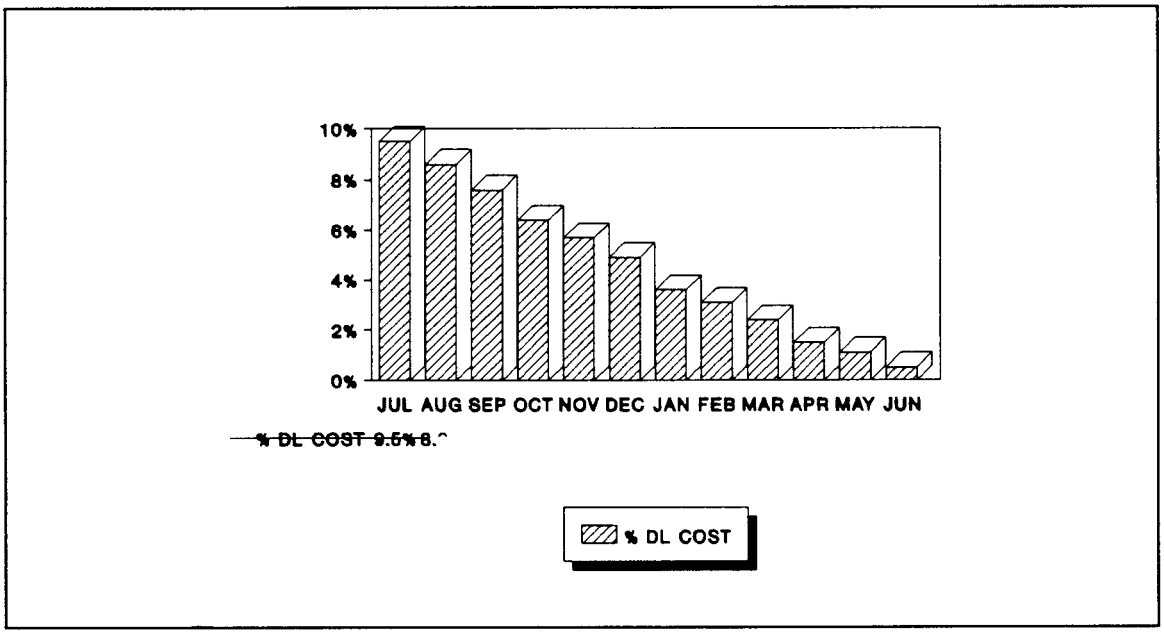
This type of chart should be used to portray lot rejection rates for purchased material.



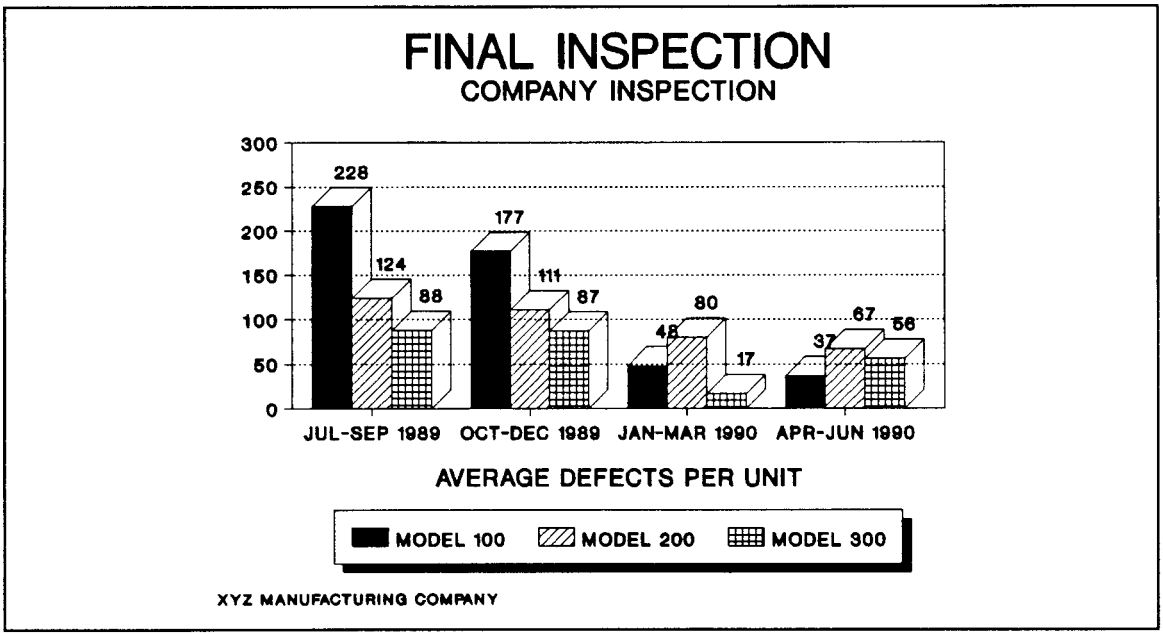
This chart was used to show subcontractor testing of LRUs was not effective. High rejection rate at contractor's plant at both LRU and system level testing.



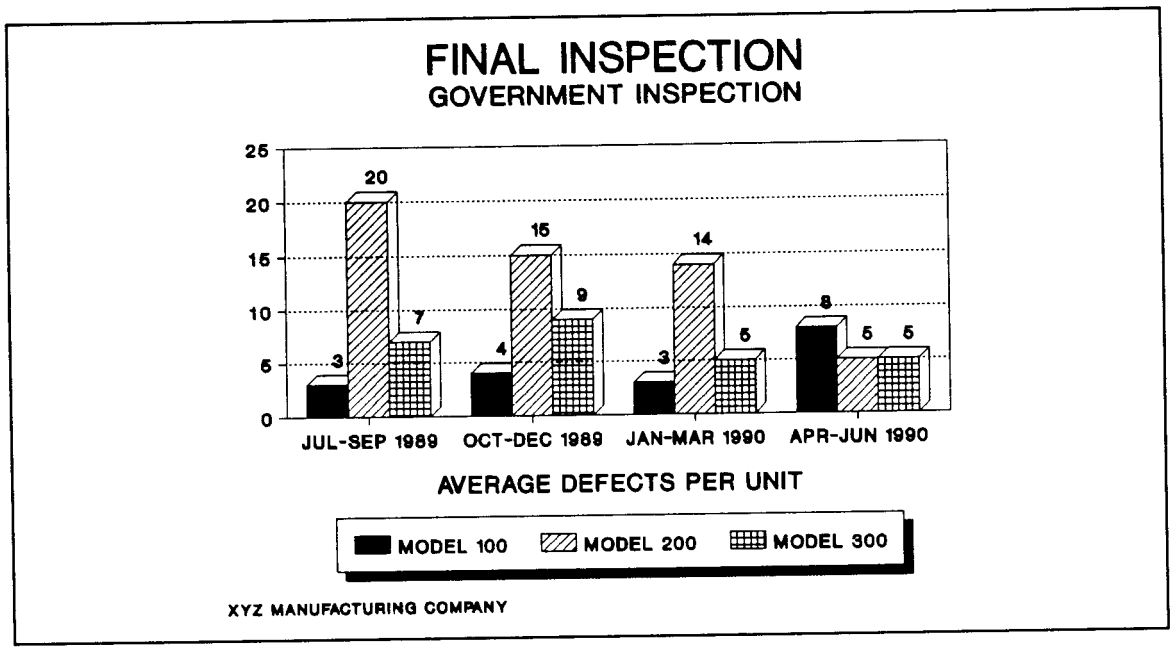
This chart was used to show poor control of a special process. Data was collected from log books during on-site assessment.



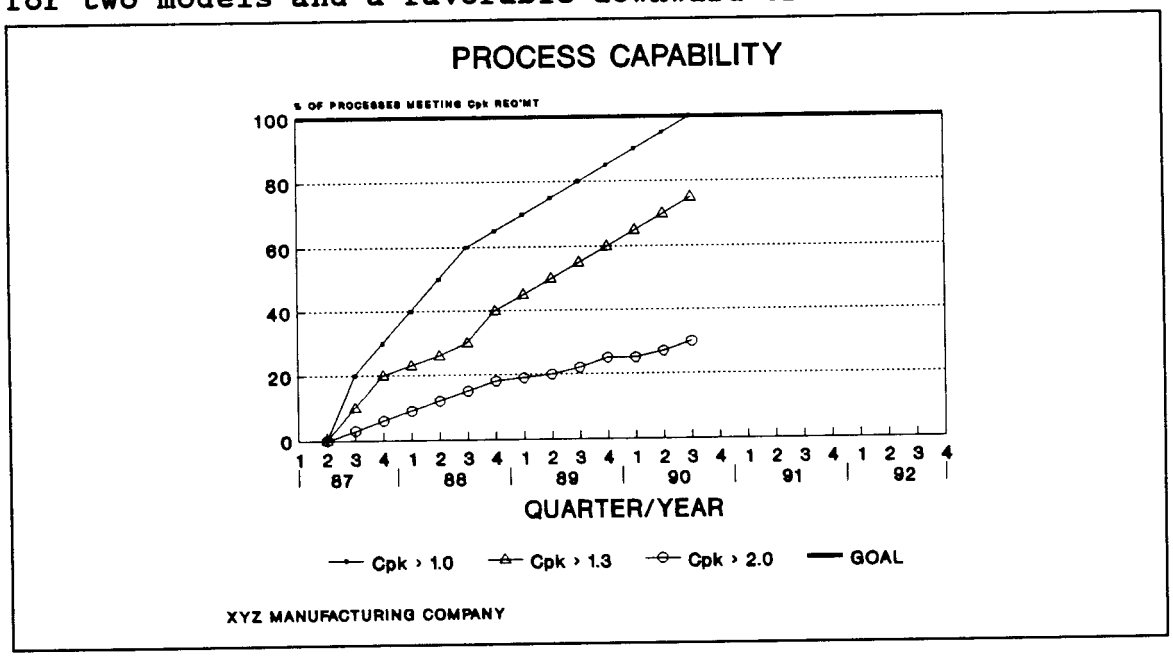
One of the best overall indicators is scrap, repair and rework costs as a percentage of direct labor. This is an effective way to present that information.



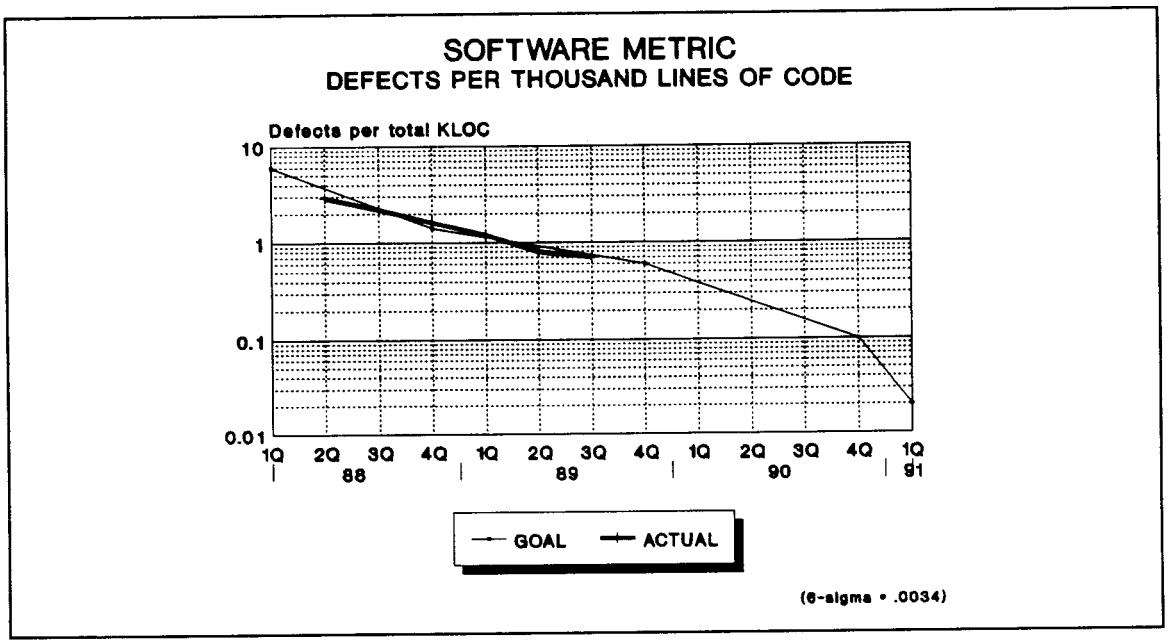
This chart reflects a steady improvement in the end item inspection results for three different models of a major system during a 1 year period. This favorable trend reflected stronger controls imposed at the component level.



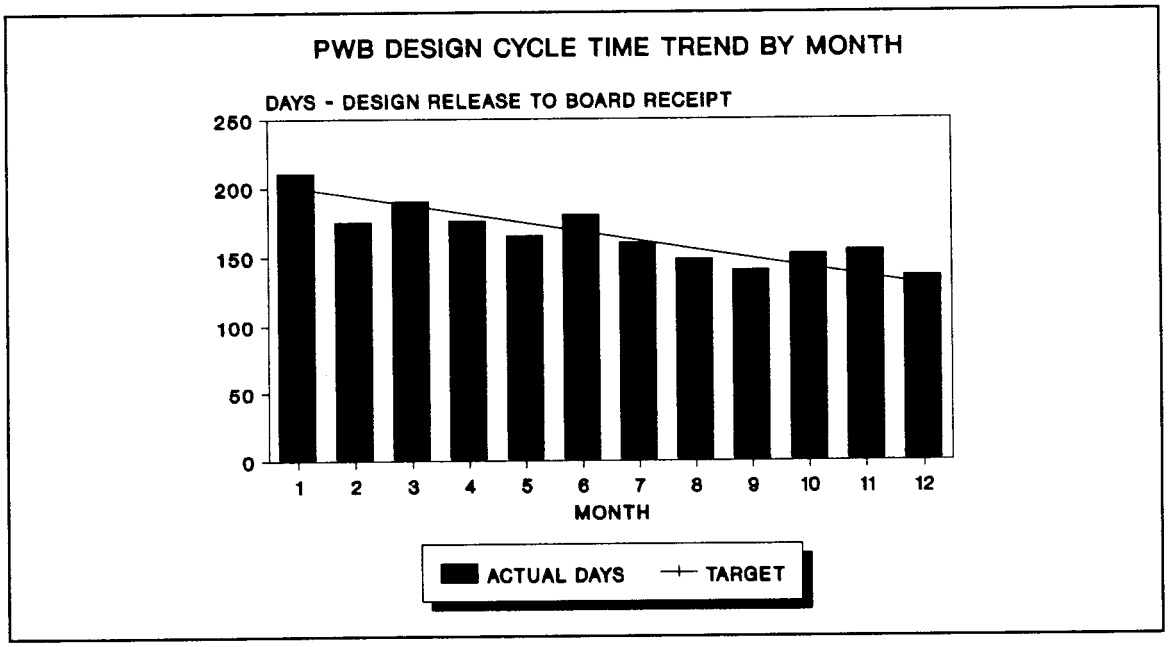
This chart shows the results of customer inspection during the same timeframe. It reflects a relatively uniform low level of defects for two models and a favorable downward trend for the third model.



This chart shows the rate of improvement in process capability in regard to the percent of processes that have reached the various levels of capability.



This chart reflects the improvement trend in regard to reducing the number of software defects per thousand lines of code.



This chart was used to portray cycle time trend in regard to a design engineering function.

GLOSSARY

ACO	Administrative Contracting Officer
AIE	Acceptance Inspection Equipment
AMC	U.S. Army Materiel Command
ASQC	American Society for Quality Control
CAR	Corrective Action Request
CCB	Configuration Control Board
CDRL	Contract Data Requirement List
CE	Concurrent Engineering
CIP	Continuous Improvement Process
CQA	Certified Quality Assessor
CQE	Certified Quality Engineer
DA	Department of the Army
DLA	Defense Logistic Agency
DOD	Department of Defense
ECP	Engineering Change Proposal
FAPCAS	Failure Analysis and Preventive/Corrective Action System
FAT	First Article Test
GOCO	Government-owned Contractor-operated
GOGO	Government-owned Government-operated
IPPD	Integrated Product and Process
ISO	International Organization for Standardization
M&TE	Measurement and Test Equipment
MANPRINT	Manpower and Personnel Integration
MRB	Material Review Board
MSC	Major Subordinate Command
PCO	Procurement Contracting Officer
PM	Project Manager
PROCAS	Process Oriented Contract Administrative Services
QA	Quality Assurance
QDR	Quality Deficiency Report
RAB	Registration Accreditation Board
RFD	Request for Deviation
RFW	Request for Waiver
SAIE	Special Acceptance Inspection Equipment
SCM	Software Configuration Management
SEI	Software Engineering Institute
SIE	Special Inspection Equipment
SPC	Statistical Process Control
SQA	Software Quality Assurance
ST	Special Tooling
TDP	Technical Data Package
TIWG	Test Integration Working Group
VR	Variability Reduction